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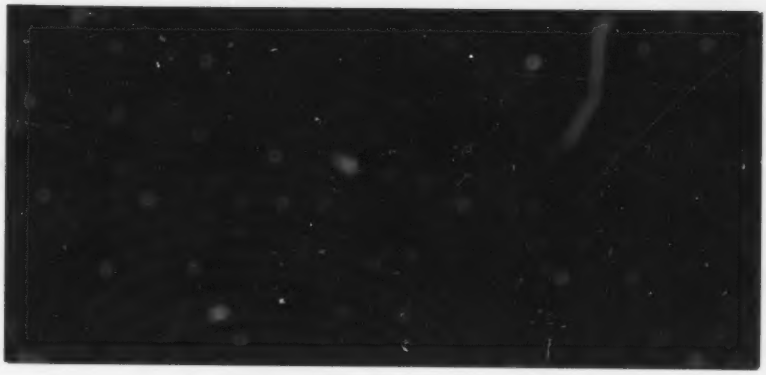

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Government Expenditure Simulation Model: Description of Model and Analysis of Options for Constitutional Reform

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Foreword

This study was conducted as part of the background research to the Economic Council's Twenty-Eighth Annual Review, *A Joint Venture*. In the Review, the Council studies the nature of interprovincial economic linkages and examines various aspects of policy harmonization within the union. It also analyses the fiscal relationships between the provinces and the federal government and discusses such key issues as the relevance of national standards, the allocation of powers among the various levels of government, and the problems created by overlapping jurisdictions. The final section of the Review presents a qualitative and quantitative analysis of some of the costs and benefits associated with some of the new fiscal arrangements that have been proposed in the current constitutional debate. Some issues related to the transition from the current system to a new form of confederation are also studied.

The present study is a shorter version of a technical paper describing the characteristics of the model used by the Council to simulate future trends in federal and provincial revenues and expenditures – the Expenditure Simulation Model (ESM). Simulations using the ESM provided the basis for the sections of the Review dealing with future trends in the size of the federal and provincial governments, the tax revenues these governments will have available to meet their spending and debt-control obligations, and their capacity to launch new programs.

Another objective of the ESM was to assess the impact on public finances of the various constitutional arrangements that have been proposed in the course of the current constitutional debate. Specifically, the model can provide a general assessment of how the tax burden of Canadians will be affected under four possible scenarios for constitutional reform; namely, moderate decentralization, extensive decentralization, a confederation of regions, and asymmetric decentralization in favour of Quebec. A detailed description of these stylized scenarios and the context in which they were studied can be found in Chapter 5 of the Annual Review.

Throughout the study, the authors stress the dangers of hasty or incorrect interpretation of the model's results. The first caveat concerns the limited ability of this type of model to capture the interaction between changes in governments' expenditures and revenues and the growth of national income. In contrast to macroeconomic forecasting models, the ESM can only project existing trends and does not take into account the various "feed-back" effects that changes in expenditures or tax rates may have on aggregate supply and demand and on economic growth. The second caveat concerns the underlying assumptions of the projections. Economic developments since the release of the Annual Review have deviated somewhat from what was anticipated – in particular, the recovery has been slow to get under way. Naturally, these developments have a direct bearing on the interpretation of

results. The final caveat is that the full impact of any constitutional option cannot be gauged using economic models. The ESM can only analyse a single aspect of the costs and benefits associated with changing the policy framework; namely, the short-term redistributive impact on the provinces of reshuffling tax and spending responsibilities. There is a whole range of other questions – economic and non-economic – connected with implementing a new policy framework that remains unaddressed by the analysis.

The authors of this study – David Péloquin, Marcel Bédard, and Haider Saiyed – pursued their research for several weeks after the release of the Review. This gave them an opportunity to fine-tune the original model to some extent; these changes are summarized in an appendix. Because of these modifications, the results reported in this study differ slightly from those reported in the Annual Review published in the fall of 1991. Nevertheless, the reader will find that the analysis and conclusions are entirely consistent with those presented in the Review.

Judith Maxwell
Chairman

Introduction

The Expenditure Simulation Model (ESM) is able to project 25 separate government expenditure items and four different revenue categories to fiscal year 2014-15. The model focuses on expenditure items that account for a significant portion of government spending or that are prime candidates for changes in their legislative jurisdiction as part of the current constitutional debate.

This working paper is a shorter version of a technical paper that presents a detailed description of the structure and parameters of the version of the model that served as a basic analytical tool for some of the conclusions presented in Chapters 4 and 5 of the 28th Annual Review of the Economic Council of Canada, which was released in October 1991. The technical paper also reports a number of improvements that were made to the model in order to correct some of the shortcomings of the preliminary version described here. The purpose of this working paper is to lay out in general terms the main assumptions underlying the construction of the scenarios, including the base case, the "expanded-government" scenario, and the sensitivity analyses for certain key assumptions.

Objectives and Analytical Framework of the Model[1]

The model has two main objectives. First, it is designed to assess governments' capacity to finance their projected expenditures on programs and services over the medium term. On the expenditures side, we wanted to take into account not only the steadily rising demand for government services, but also the tax constraints that are exerting countervailing pressure. Accordingly, our base case assumes that future developments in certain expenditure categories (health care and certain "universal" programs, for instance) will basically continue to less follow the trends that have been evident in recent years, subject to political and social dynamics. While other "non-universal" expenditure categories will also grow, their growth will be limited by the emphasis on fiscal restraint that has prevailed over the past few years. In some other cases, spending will decline in response to structural factors.

On the revenues side, the model is able to calculate the degree of tax effort that will be needed to respond to anticipated pressures on government spending while conforming to an exogenously determined debt profile. In the first few years of the scenario, the model generally assumes that existing tax structures are maintained, so that revenues evolve according to macroeconomic forecasts and the statutory provisions of the tax system. The resulting deficits and debt levels are therefore directly related to anticipated spending levels and economic performance. Later on (typically starting in 1992-93 at the provincial/local level and 1994-95 at the federal), an exogenously specified debt profile is imposed on both levels of government. Revenue levels must then adjust to conform to this debt profile, which

makes it possible to study to what extent governments will be forced to modify their overall tax systems in order both to respond to probable pressures on expenditures and to maintain (or, in the case of the federal government, to re-establish) a degree of control over their debt levels.

It should be stressed that the model is not designed to analyse the possible macroeconomic effects of governments' fiscal policy decisions. Although the model relies on forecasts generated by the macroeconomic model used by the Economic Council (MTFM), it is not formally integrated with it. Thus it cannot be used to study the multiple economic interactions between fiscal and tax policy, on the one hand, and economic growth, on the other. Unlike a macroeconomic model, the ESM does not take into account the impact of an increase in budgetary spending or tax effort on consumption, investment and national revenue (or vice versa). Obviously, these limitations must be borne in mind when interpreting the simulation results reported in this paper – particularly in the case of simulations involving major changes to the structure and relative size of the country's public sector.

The second objective of the model is to measure the impact of various constitutional reform options on the tax burdens faced by the residents of the various provinces. As explained in the 28th Annual Review, the four constitutional reform scenarios selected for analysis should be considered as stylized options, since each represents a synthesis of a number of proposals raised at various times in the course of public debate.

In each option, it is taken for granted that the provinces will assume their share of federal expenditures, that they will receive transfer payments out of federal revenues commensurate (for the provinces as a whole) with their new spending responsibilities, and that they will adjust their tax effort in order to maintain the same debt profile as in the status quo. The four constitutional options analysed by the model are described in detail in Appendix B. Briefly, they are as follows:

- The main feature of the *"moderate-decentralization"* option is the elimination of federal/provincial overlaps created by federal involvement in the fields of health care, education, manpower training, and social welfare. These are areas where federal government transfers are principally made to the provincial governments (or the organizations they fund) rather than to the public. Under this option, federal transfers under Established Program Financing (EPF) and the Canada Assistance Program (CAP) would be eliminated. Also eliminated would be the federal government's "direct" expenditures on health care, education, and social welfare services (which, in these areas, are very small compared with transfers), as well as on manpower training (with the exception of training benefits paid to trainees under the unemployment insurance program).[2]

- The *"extensive-decentralization"* option involves, in addition, the assumption by the provinces of responsibility for direct federal transfers to individuals (including unemployment insurance, Old Age Security benefits, and family allowances), as well as for federal expenditures related to what we term "sectoral" policy (which includes regional development, natural-resource development, research and development, communication, and culture and leisure).

- The *"confederation-of-regions"* option involves, in addition, the elimination of all other federal government transfers to provinces and municipalities – notably, equalization payments – and the transfer to the provinces of responsibility for Indian affairs and a long list of "other" federal expenditures. Only national defence, veterans' affairs, external affairs (including international aid) and a few other responsibilities related to transportation, the environment and justice would remain under federal government jurisdiction.

- *"Sovereignty-association"* between Quebec and the rest of Canada is the only "asymmetric" option examined. For Quebec, it would involve the transfer of the same responsibilities as in the confederation-of-regions option (and thus Quebec's withdrawal from the equalization program). In addition, Quebec would assume responsibility for its share (probably pro-rated on the basis of its GDP) of federal spending on defence, veterans' affairs, external affairs, transportation, the environment, and justice. Quebec would also assume a portion of the current federal debt (equal to 22 per cent). For the nine other provinces, the status quo would remain in effect in terms of the allocation of federal expenditures and trends in federal transfers at the provincial/local level.

Assumptions Regarding Expenditure Items

Factors Influencing Expenditure Trends

The ESM uses essentially the same expenditure categories found in Statistic Canada's system of Government Financial Management Statistics (FMS).[3] Although FMS data would allow a number of expenditure items to be simulated on a highly disaggregated basis, in the interests of simplicity we restricted ourselves to a relatively aggregated breakdown of certain selected expenditure items. In particular, we focused on categories that encompass large expenditures relative to total public-sector spending and categories that concern jurisdictional areas likely to be subject to change under constitutional negotiations. Appendix B provides further detail on the expenditure items used in the model.

Decomposition of Expenditure Trends

Theoretically, there are three types of factors that influence developments in dollar spending:

(i) a "demographic" component – i.e., pressures linked mainly to the aging and overall growth of the population;

(ii) an "inflation" component – i.e., pressures linked to increases in the prices of inputs associated with the delivery of one unit of service to the customer (including any change in relative prices); and

(iii) a "basic demand/supply" component – i.e., trends in expenditures linked to an increase in the *volume* of services *demanded by the public and actually delivered by government,* discounting changes in unit costs and demographic factors.

In practice, however, it must be acknowledged that the distinction between these three components is essentially arbitrary and that it is not always possible nor desirable to model these components separately. For example, we explicitly included the demographic component only where expenditures vary significantly in response to demographic factors – particularly "statutory" and "universal" programs like elderly benefits programs, family allowances, and unemployment insurance.

In addition, in a number of other cases where demographically driven pressures were considered significant, we elected to incorporate this factor on an ad hoc basis into the "basic demand/supply" component rather than modelling it separately. Such was the case, for example, with expenditures targeted at Native Canadians – where there was no model available to simulate the demographic evolution of this population – and with child care and other items where it was reasonable to assume that any spending increases would be faced with significant policy and (particularly) fiscal constraints that would make it less likely that the "supply" of government services would suffice to meet growing basic demand, whether due to demographic pressures or not.

Generally speaking, the model also ignores the distinction between the "inflation" and "basic demand/supply" components. In certain cases, it would impractical to do otherwise. For example, it could be argued that the rapid growth of unit costs in the health-care category in recent decades may be partly attributed to technological advance (and thus that it reflects the improving quality of the services provided by governments; i.e., it is an element of real "wealth" falling under the "basic demand/supply" component). However, it might also be argued that increasing costs reflect the deteriorating efficiency of these services or an increase in the relative prices of the inputs needed for their delivery, indicating that these costs should be included in the "inflation" component.

A General Rule and Some Exceptions

For most of the expenditure items in the base case, we chose to model an increase in spending as follows:

- for items which include an explicitly modelled demographic component, unit costs grow in line with per-capita GDP. This is the case for, notably, provincial/local expenditures on education, social welfare and training, as well as federal expenditures on unemployment insurance and the child tax credit program;

- for items that do not include an explicitly modelled demographic component, total spending grows in line with GDP.

The assumption that certain expenditure items (e.g., unemployment insurance) grow in response not only to inflation but also to real economic growth derives from statutory regulations.[4] We also decided that this assumption was warranted for several other expenditure items which, while they are not "statutory" or formally indexed, have nevertheless historically displayed a tendency to grow in line with GDP.

As indicated in Appendix C, however, there are many exceptions to the general rule of growth in line with GDP (or per-capita GDP) – even in the base case. Some notable examples are provincial/local expenditures on health care (which historically have posted unit-cost increases more rapid than per-capita GDP), family allowances and elderly benefits programs (in which statutory indexing formulas link unit-cost increases to the consumer price index rather than to per-capita GDP), and programs for Native Canadians.

The growth of several federal expenditure items is also subject to a variety of restrictions introduced by recent federal budgets. We assume that the following restrictions remain in effect for the duration of the fiscal-restraint plan:

- growth in federal transfers under Established Program Financing (EPF, concerned with health care and postsecondary education) will evolve in such way that the cash component of these transfers will disappear in Quebec by 1997-98 and in the other provinces by 2002-03;

- the growth of federal transfers to the three "rich" provinces (Ontario, Alberta, and British Columbia) under the Canada Assistance Program (CAP, concerned with social welfare) will be limited to 5 per cent a year until 1995-96;

- the "ceiling" that has held the growth of equalization payments to the cumulative growth of GDP since 1987 will remain in effect until 1994-95;

- the growth of Official Development Assistance will be limited to 3 per cent a year until 1995-96;

- the growth of all other program expenditure items (with the exception of unemployment insurance, transfers to the less well-off provinces under CAP, housing, elderly and child benefits programs, and programs for Natives and veterans) will be limited to 1.7 per cent a year until 1995-96.

In addition, we model a number of additional pressures on an ad-hoc basis. For example, in the base case, we incorporate the following changes, among others:

- a permanent decline in basic spending on defence (a "peace dividend"), beginning in 1994-95;

- a significant decline in basic spending on veterans over the simulation period;

- a permanent increase in basic spending on manpower training (in accordance with the 1990 reform of the unemployment insurance program);

- an increase or decrease in basic spending on unemployment insurance in direct proportion to projected unemployment levels;

- a temporary increase (spread over 10 years, starting in 1994-95) in basic spending to refurbish public infrastructure; and

- a temporary increase (spread over 10 years, starting in 1994-95) in basic spending on Native Canadians as part of land-claim settlements with the First Nations.

In what we term the "expanded-government" scenario, we postulated a number of pressures in addition to the above departures from the base case. That scenario is designed to map out the upper limit for plausible scenarios by assuming a significant increase in government expenditures under several items. The growth assumptions for the various expenditure categories – under both the "expanded government" scenario and the base case – are described in Appendix C.

Debt Service

The basic assumptions connected with debt-service trends deserve more detailed discussion. Debt service depends on two factors: governments' financial liabilities and the associated effective rate of borrowing. In the ESM, future developments in total liabilities depend entirely on the budget deficits of the governments in question, since larger deficits increase the level of liabilities to which the effective borrowing rate applies.

The effective borrowing rate, for its part, is presumed to conform to the interest-rate forecasts carried out by the Economic Council. However, since part of the outstanding debt of any government reflects previous borrowing at various interest rates for various terms, there will be a certain lag in the adjustment of the effective borrowing rate to current rates. Because no detailed data are available on the composition of the outstanding liabilities of the federal government and each of the provincial governments, we were forced to simplify the way effective borrowing rates are modelled.

First, we assumed that outstanding debt is composed of two types of securities: short-term (with terms of 90 days) and long-term (with terms of 20 years). *Current* borrowing rates for these two types of securities are based on federal borrowing rates as projected by the Council. Second, we felt it reasonable to assume that these rates will return to their historical spreads once economic activity stabilizes. Thus we assumed a gradual movement back to a differential of 165 basis points, corresponding to the average differential over the period 1961-90 (see Table 1).

We further assumed that the various strategies for managing liabilities at the federal and provincial/local levels – particularly the tendency of the federal government to issue securities with shorter terms than those of the provinces and local administrations – will be maintained. Accordingly, we assumed the average term of federal loans to be 7.5 years and the provincial average 10 years. Since long-term rates are typically higher than short-term rates, the debt service costs of the provinces will necessarily be higher. However, we also postulated that there are additional provincial/local differentials (i.e., relative to federal borrowing rates) in order to capture the spreads that have historically existed between prevailing federal and provincial/local rates.

Finally, consistent with the assumption that current rates prevail after the year 2000, *effective* borrowing rates are assumed to converge on average current rates in accordance with (i) the "dilution" of outstanding debt through new issues to finance annual deficits, and (ii) the replacement at expiry of the long-term securities that have historically made up part of outstanding debt, which were issued at different (i.e., typically higher) rates relative to current rates. Table 2 shows how effective rates have changed over the historical period (fiscal years 1984-85 to 1990-91) and indicates their subsequent convergence towards current average rates.

It should be noted that the sovereignty-association option modelled in the ESM also postulates an implicit additional premium on Quebec's borrowing once constitutional changes come into effect in 1994-95. Because Quebec assumes part of federal liabilities under this option, the province will likely have to issue new securities under its own name in order to be able to reimburse its share of Canadian government liabilities. Given that the current average rate for Quebec is lower than the effective rate, the effective rate might have been altered on an ad-hoc basis to reflect

Table 1
Current Rates of Borrowing

As projected by the macroeconomic model, adjusted so as to return to historical spreads (1961-90) by 2000-2001

Fiscal year	90-day rate	20-year rate
1984-1985	9.430	11.635
1985-1986	8.971	10.297
1986-1987	8.146	10.612
1987-1988	9.483	10.845
1988-1989	12.054	10.488
1989-1990	12.808	11.590
1990-1991	9.106	10.968
1991-1992	8.739	10.868
1992-1993	7.913	10.421
1993-1994	6.923	9.723
1994-1995	5.310	8.343
1995-1996	5.704	8.506
1996-1997	5.850	8.421
1997-1998	5.875	8.215
1998-1999	5.860	7.969
1999-2000	5.475	7.352
2000-2001 to 2014-2015	5.500	7.146

The effective borrowing rate, for its part, is presumed to conform to the interest-rate forecasts carried out by the Economic Council. However, since part of the outstanding debt of any government reflects previous borrowing at various interest rates for various terms, there will be a certain lag in the adjustment of the effective borrowing rate to current rates. Because no detailed data are available on the composition of the outstanding liabilities of the federal government and each of the provincial governments, we were forced to simplify the way effective borrowing rates are modelled.

First, we assumed that outstanding debt is composed of two types of securities: short-term (with terms of 90 days) and long-term (with terms of 20 years). *Current* borrowing rates for these two types of securities are based on federal borrowing rates as projected by the Council. Second, we felt it reasonable to assume that these rates will return to their historical spreads once economic activity stabilizes. Thus we assumed a gradual movement back to a differential of 165 basis points, corresponding to the average differential over the period 1961-90 (see Table 1).

We further assumed that the various strategies for managing liabilities at the

components: (i) revenues from taxes on interest income received by holders of government securities and (ii) all other government budgetary revenues.[7]

As previously indicated, the main purpose in simulating revenues is to determine the increases (or decreases) in government revenues that would be needed to respond to pressures on expenditures while maintaining a sound budgetary position in terms of the public debt. We focused in particular on the level of "general" revenues (including revenues from the taxation of interest income from government debt[8]) by assuming that the two other revenue sources in the model would remain unaffected by government tax measures designed to help meet these objectives.

In the case of unemployment insurance benefits, this approach is justified because of the statutory requirement that the unemployment insurance fund remain balanced (at least in the long run). Accordingly, we assume that, after a transition period,[9] the amount of premiums collected will be equal to benefits paid. In the case of seigniorage revenues, we simply assume they will grow in line with GDP. In other words, we assume a constant rate of expansion in the money supply and the maintenance of a responsible attitude towards monetary policy that precludes the federal government financing its activities through increases in the money supply.

When no government debt profile is specified, general revenue trends are assumed to be determined by:

- the growth of debt and movements in the average effective interest rates applicable to that debt (in the case of revenues derived from taxation of interest on government debt); and

- the growth of GDP (in the case of all "other" general revenues).

In the case of "other" general revenues, however, there is an important exception to the rule of growth at the GDP rate. During the period ending with 1995-96, we assume that these revenues will reflect the effects of, first, the economic recovery (which should lead to revenues increasing faster than GDP because of the expanding tax base and the progressive nature of the tax system) and, second, the partial deindexing of the exemptions, credits and schedules associated with personal income tax (which should also lead to a significant portion of government revenues increasing faster than GDP). We simply assume that, during this period, the rate of growth of general revenues will conform to the medium-term forecasts made by the Economic Council, and that, at the end of the period, the "normal" trend of revenue growth in line with GDP will reassert itself as a result of either formal reindexing of the tax system or ad-hoc measures with the same effect.

Lastly, the model is designed so that the user may specify a debt profile (expressed as a percentage of GDP) in order to calculate the level of tax effort

Table 2

Effective Rates of Borrowing

Transition to average current rates assumed for new borrowing

Fiscal year	Federal	Newfound-land	P.E.I.	Nova Scotia	New-Brunswick	Quebec	Ontario	Manitoba	Saskat-chewan	Alberta	British Columbia
1984-1985	10.57	10.74	11.65	11.17	10.82	9.69	8.18	7.35	5.57	7.14	8.38
1985-1986	10.19	11.23	18.96	10.80	10.95	9.23	8.16	7.04	5.84	8.51	8.22
1986-1987	9.33	11.18	12.25	10.48	10.22	8.93	8.09	6.79	7.08	5.95	7.27
1987-1988	9.08	11.38	11.68	10.34	9.32	8.69	8.21	6.88	7.75	7.64	6.33
1988-1989	9.44	11.11	10.93	9.79	9.50	8.41	8.74	6.72	6.95	6.33	6.64
1989-1990	10.27	11.35	11.18	10.15	9.88	8.90	9.18	7.38	7.59	7.02	7.30
1990-1991	10.04	11.34	11.19	10.25	10.01	9.12	9.36	7.75	7.94	7.42	7.67
1991-1992	9.75	11.25	11.14	10.32	10.11	9.30	9.50	8.06	8.24	7.76	7.98
1992-1993	9.35	10.99	10.90	10.32	10.13	9.39	9.56	8.27	8.44	8.00	8.20
1993-1994	8.80	10.57	10.48	10.06	9.92	9.39	9.47	8.38	8.54	8.13	8.31
1994-1995	7.82	9.73	9.66	9.45	9.32	8.95	8.89	8.22	8.35	8.03	8.16
1995-1996	7.94	9.72	9.65	9.42	9.31	8.95	8.90	8.29	8.41	8.11	8.23
1996-1997	7.31	9.60	9.53	9.32	9.22	8.89	8.83	8.29	8.40	8.12	8.23
1997-1998	7.22	9.42	9.36	9.16	9.07	8.77	8.71	8.23	8.34	8.08	8.17
1998-1999	7.11	9.22	9.17	8.99	8.91	8.64	8.56	8.15	8.25	8.01	8.09
1999-2000	6.75	8.76	8.72	8.58	8.51	8.28	8.17	7.84	7.93	7.70	7.78
2000-2001	6.65	8.59	8.55	8.42	8.35	8.15	8.03	7.74	7.83	7.62	7.68

2001-2002	6.59	8.48	8.45	8.32	8.27	8.08	7.95	7.70	7.79	7.59	7.65
2002-2003	6.54	8.39	8.36	8.24	8.18	8.01	7.89	7.67	7.75	7.56	7.61
2003-2004	6.50	8.31	8.28	8.16	8.11	7.95	7.82	7.64	7.72	7.53	7.58
2004-2005	6.46	8.24	8.21	8.09	8.05	7.90	7.77	7.61	7.69	7.51	7.56
2005-2006	6.43	8.17	8.14	8.03	7.99	7.85	7.72	7.59	7.66	7.49	7.53
2006-2007	6.39	8.11	8.09	7.97	7.94	7.80	7.67	7.56	7.63	7.47	7.51
2007-2008	6.36	8.05	8.03	7.92	7.89	7.77	7.63	7.54	7.61	7.46	7.49
2008-2009	6.34	8.00	7.99	7.87	7.85	7.73	7.59	7.53	7.59	7.44	7.47
2009-2010	6.31	7.96	7.94	7.83	7.81	7.70	7.56	7.51	7.57	7.43	7.46
2010-2011	6.29	7.92	7.91	7.80	7.77	7.67	7.53	7.49	7.56	7.42	7.44
2011-2012	6.27	7.88	7.87	7.76	7.74	7.64	7.50	7.48	7.54	7.41	7.43
2012-2013	6.26	7.85	7.84	7.73	7.71	7.62	7.48	7.47	7.53	7.40	7.42
2013-2014	6.24	7.82	7.81	7.71	7.69	7.60	7.46	7.46	7.52	7.39	7.41
2014-2015	6.23	7.80	7.79	7.68	7.67	7.58	7.44	7.45	7.51	7.38	7.40
Convergence rate	6.10	7.56	7.56	7.46	7.46	7.41	7.26	7.36	7.41	7.31	7.31

needed to achieve that profile while satisfying the presumed pressures on the expenditure side. Once the period subject to the debt profile begins, "other" general revenues no longer conform to macroeconomic forecasts or to GDP, but evolve so as to respect the specified debt target. As indicated in Chapter 4 of the 28th Annual Review, our analysis included three different debt profiles at the federal level and one at the provincial/local level. Figure 1 shows historical data since 1961 and the results of the three scenarios that focus on future debt developments at the federal and provincial/local levels. Briefly, the provincial/local profile assumes that the debt/GDP ratio will remain constant at its 1991-92 level from 1992-93 onward. In the federal "high-debt" profile, the federal debt/GDP ratio follows the same pattern, but starting only in 1994-95 (i.e., maintaining its 1993-94 level). The federal "medium-debt" profile assumes a decline of 1 percentage point a year in the ratio starting in 1994-95, while the "low-debt" profile assumes a decline of 2 percentage points a year.[10]

Macroeconomic and Demographic Assumptions

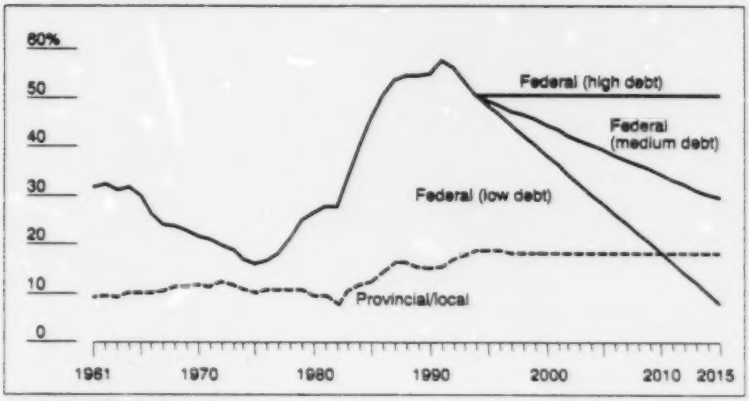
Macroeconomic Projections

For a number of expenditure items that follow the rate of growth of the GDP, the Consumer Price Index (CPI), interest rates, and unemployment and employment developments, the ESM uses series to the year 2000 provided by the Economic Council's macroeconomic model (MTFM). The underlying macroeconomic assumptions of the projections are the same as those used in the base case described in the Council's 28th Annual Review.[11] In subsequent years, we generally used the values for the year 2000. One exception to this rule is the real GDP growth rate, which declines in line with demographic projections of a slowdown in the growth of the working-age population. Lastly, for the period that is presumed to include federal fiscal restraint and economic recovery, it is assumed that general revenues at the federal and provincial/local levels will grow in accordance with Council forecasts. Table 3 shows the key macroeconomic projections of the Council's base case.

Ideally we would have liked to have a separate projection for each province, particularly for GDP growth rates and general revenues at the provincial/local level. Since the Council's macroeconomic forecasting model does not provide this, however, we decided to assume that the rates of growth for the expenditure items that depend on these two variables will be the same across all provinces, discounting adjustments to reflect relative population growth in each province.[12]

Figure 1

Federal and provincial/local debt, Canada,[1] 1961-2015



1 As a proportion of GDP.

Demographic Projections

The detailed modelling of demographic components is based on projections to the year 2014-15 of 36 population groups by age and sex for each of the ten Canadian provinces. These projections were produced by the Economic Council's demographic model[13] and reflect the following assumptions, among others:

- the birth rate remains at its current level throughout the simulation period;
- the country's net immigration rate remains at the level announced in October 1990 by the Minister of Employment and Immigration throughout the period;
- interprovincial migration patterns reflect Statistic Canada's "westward migration" hypothesis.[14]

Assumptions Regarding the Modelling of Options for Constitutional Reform

Overview of the Process

Basically, the transition from the constitutional status quo to a particular reform option involves transferring various federal expenditure items (and, in certain

Table 3

Key Macroeconomic Assumptions Derived From MTFM

Fiscal year	GDP deflator growth rate	Real GDP growth rate	Growth rate of general federal revenues	Growth rate of general provincial revenues	Percentage of population employed	Percentage of population unemployed
1984-1985	2.6	4.8	9.2	9.3	44.7	5.2
1985-1986	2.4	3.3	9.2	5.4	45.6	4.8
1986-1987	4.7	4.2	10.1	4.5	46.4	4.5
1987-1988	4.8	4.7	11.6	12.6	47.4	4.0
1988-1989	4.7	2.5	7.3	8.2	47.8	3.9
1989-1990	3.0	0.5	8.0	6.9	47.4	4.2
1990-1991	4.0	0.0	6.1	5.5	46.1	5.3
1991-1992	2.9	4.2	9.5	3.6	46.5	5.2
1992-1993	2.4	5.1	7.2	6.1	47.2	4.9
1993-1994	2.2	4.5	6.2	6.3	48.0	4.5
1994-1995	2.0	4.3	5.7	5.6	48.9	4.3
1995-1996	2.0	4.4	5.8	6.2	49.8	4.1
1996-1997	1.8	4.3	4.1	4.8	50.7	3.9
1997-1998	1.5	3.9	n.a.	n.a.	51.2	3.8
1998-1999	1.5	3.5	n.a.	n.a.	51.4	3.8
1999-2000	1.5	3.0	n.a.	n.a.	51.6	3.7
2000-2001	1.5	3.0	n.a.	n.a.	52.1	3.7

2001-2002	1.5	3.0	n.a.	n.a.	52.4	3.8
2002-2003	1.5	2.9	n.a.	n.a.	52.8	3.8
2003-2004	1.5	2.9	n.a.	n.a.	53.1	3.8
2004-2005	1.5	2.8	n.a.	n.a.	53.5	3.8
2005-2006	1.5	2.7	n.a.	n.a.	53.8	3.9
2006-2007	1.5	2.6	n.a.	n.a.	54.1	3.9
2007-2008	1.5	2.6	n.a.	n.a.	54.4	3.9
2008-2009	1.5	2.5	n.a.	n.a.	54.7	3.9
2009-2010	1.5	2.5	n.a.	n.a.	55.0	3.9
2010-2011	1.5	2.4	n.a.	n.a.	55.2	4.0
2011-2012	1.5	2.4	n.a.	n.a.	55.5	4.0
2012-2013	1.5	2.3	n.a.	n.a.	55.7	4.0
2013-2014	1.5	2.3	n.a.	n.a.	55.9	4.0
2014-2015	1.5	2.3	n.a.	n.a.	56.2	4.0

cases, revenue items) to the provinces.[15] The initial impact of such a move would be a change in the level of budgetary spending at both levels of government. This would lead to two types of adjustments:

- adjustments in federal and provincial/local tax efforts in the case of general revenues and revenues derived from the taxation of interest on government debt in order to maintain the same debt/GDP profile as in the status quo;[16] and

- in the case of the two symmetric decentralization options, adjustments in the equalization system to take into account the impact of the increased provincial tax effort on equalization payments as calculated according to the present formula.

Adjusting the Tax Effort

We assume that any decrease in federal spending implies an equivalent reduction in federal tax receipts (at the level of the country as a whole). In other words, the federal government would reduce its tax effort uniformly in all provinces. At the same time, it is expected that tax receipts at the provincial/local level would increase proportionately to the new expenditure commitments. However, since some provinces will be affected differently by the elimination of federal spending and tax collection activities, the residents of provinces with high fiscal capacity (and those that depend less on the foregone federal expenditures) will end up with a lower tax burden than under the status quo, while residents of the less well-off and more "dependent" provinces will find themselves facing a heavier tax burden.

Adjusting the Equalization System

The equalization system works as follows. When the fiscal capacity of a province is below the national norm, equalization payments are calculated so as to make up the difference between the revenues produced in the province by a tax effort equal to the average across all provinces and the amount of revenues that the province would receive with the same tax effort if its fiscal capacity were equal to the norm. Equalization payments to eligible provinces, therefore, would have to be increased under both decentralization scenarios to reflect the increase in tax effort in the provinces as a whole.

The sources of input data and the structure of the main equations involved in modelling the assumptions discussed above are presented in Appendix D.

Simulation Results and Sensitivity Analysis[17]

Base Case

Projection of Overall Expenditures and Revenues Under the Status Quo

The results of the expenditure simulations shown in Figure 2 illustrate the rising trend in expenditures at the provincial/local level and the declining trend in federal expenditures.[18] The projected increase in total provincial/local expenditures is primarily due to the constant pressure on health care costs exerted by the rapid increase in average costs across all age groups and by the aging of the population. At the federal level, declining debt service is the main factor in the fall in federal expenditures during the simulation period. The detailed results of revenue and expenditure simulations for both levels of government under the base case with the "medium-debt" profile may be found in Appendix E.

At the provincial/local level, this expenditure profile produces an upward trend in the tax effort (expressed as own-source revenues as a percentage of GDP) needed to meet expenditure requirements and debt targets (Figure 3). The general increase over the next 25 years is about 3 per cent of GDP – substantially less than the increase in provincial/local tax effort over the past 25 years.[19]

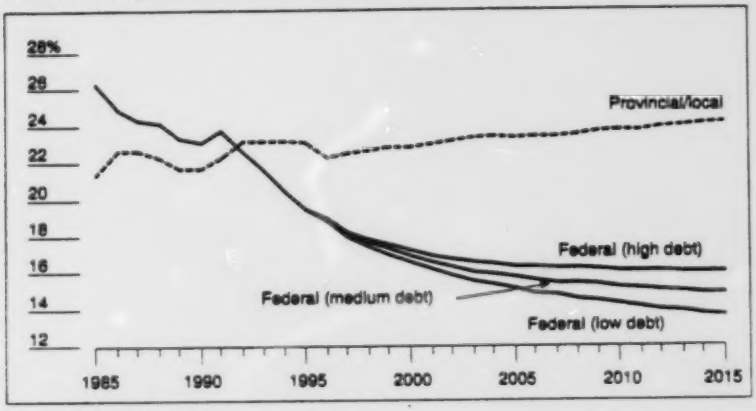
At the federal level, projections indicate a decline from 1994-95 onward in the federal expenditures required to satisfy expenditure requirements and to achieve stabilization and debt-reduction objectives during the simulation period. This decline varies from 1.6 to 3.6 per cent of GDP depending on the debt/GDP ratio used in the scenario. The results imply, therefore, that the tax and fiscal system currently in place would allow the government to pursue a relatively ambitious debt-reduction strategy in the medium and long run while still being able to reduce taxes or increase budgetary spending.

In fact, as shown in Figures 4 and 5, if no debt/GDP ratio target is set and if the assumptions concerning revenues and expenditures (listed in Appendix B) prove accurate, our projections indicate that the federal government will begin to post substantial budget surpluses by the end of the decade and that the debt/GDP ratio will start to decline even more rapidly than under all the targets shown in Figure 1. Theoretically, these surpluses could be used to completely eliminate the current federal debt by 2004-05.

This rather surprising result primarily reflects the cumulative effect of budgetary restraint and tax increases in recent years. It is implicitly conditional upon current

Figure 2

Federal and provincial/local expenditures,[1] 1985-2015

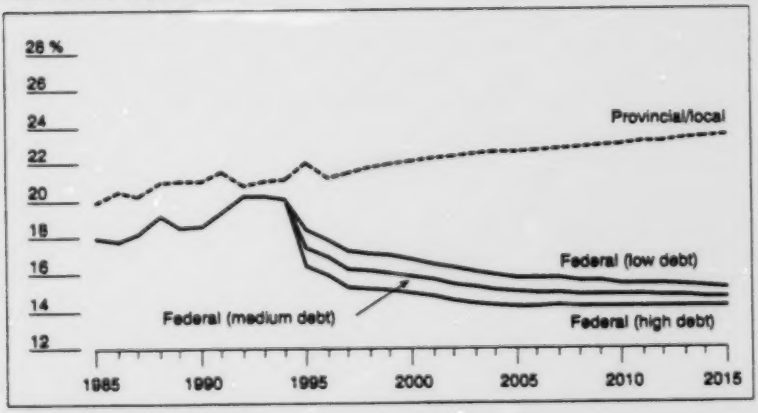


1 As a proportion of GDP.

NOTE Transfers from the federal government to the provincial/local level have been subtracted from provincial/local expenditures to avoid double counting.

Figure 3

Required federal and provincial/local expenditures, base case,[1] 1985-2015

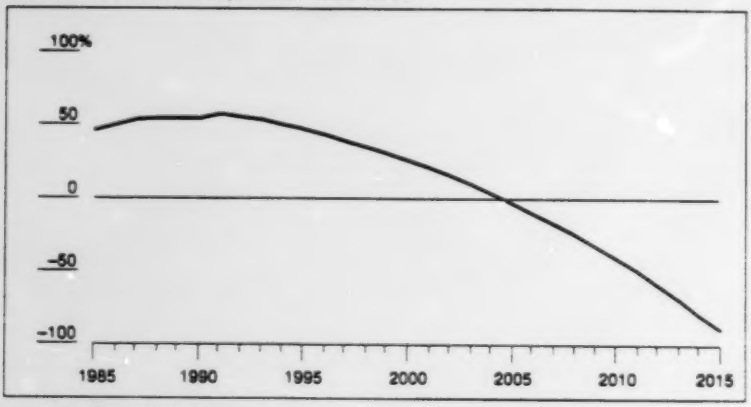


1 As a proportion of GDP.

NOTE This figure reports own-source revenues. Transfers from the federal government to the provincial/local level have been subtracted to avoid double counting.

Figure 4

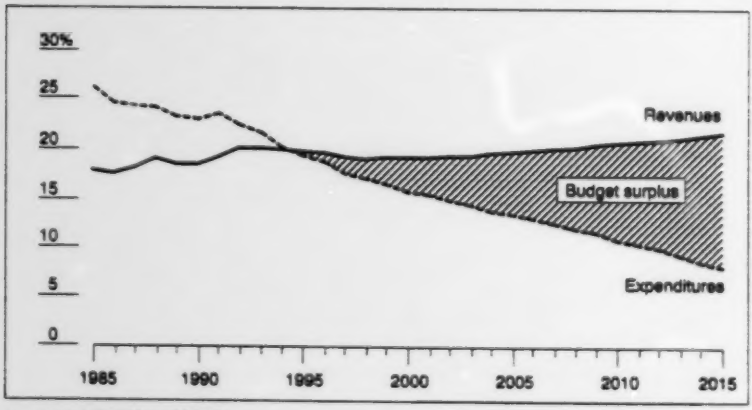
Federal debt with no profile,[1] 1985-2015



1 As a proportion of GDP.

Figure 5

Federal revenues and expenditures with no debt/GDP profile,[1] 1985-2015



1 As a proportion of GDP.

controls over federal expenditures being maintained until 1995-96, as announced in recent federal budgets. And it is also reinforced by the implicit economic trends in the base-case projections for the 1990s, particularly faster output growth and falling interest rates.

Overall, then, federal income taxes would appear to be higher than necessary both to meet the projected expenditure requirements of the federal government and to achieve some relatively ambitious long-term targets for reducing the federal debt. Consequently, sometime in the mid-1990s the federal government may begin to enjoy some fiscal "breathing space" – assuming, naturally, that the relatively favourable economic conditions postulated in the medium-term scenario actually come about. As we go to press, however, it appears that the economic recovery will be much slower than assumed in our macroeconomic projections. In the following pages, we will analyse the results reported herein in order to test their sensitivity to such factors as slower-than-expected economic growth in the base case, and higher-than-expected interest rates.

Obviously, one possible option for the federal government would be to use this breathing space (of between 1.6 and 3.6 per cent of GDP, as we saw earlier) to increase its spending in new or existing categories, or to reduce the federal tax effort. This is illustrated in Figure 3. To give the reader a better idea of the extent of this breathing space, note that it is roughly equivalent to some of the largest categories of federal program spending at the present time (1990-91) – Old Age Security (2.6 per cent of GDP), unemployment insurance (2.6 per cent), national defence (1.6 per cent), health care (1.3 per cent), and social welfare (1.1 per cent).

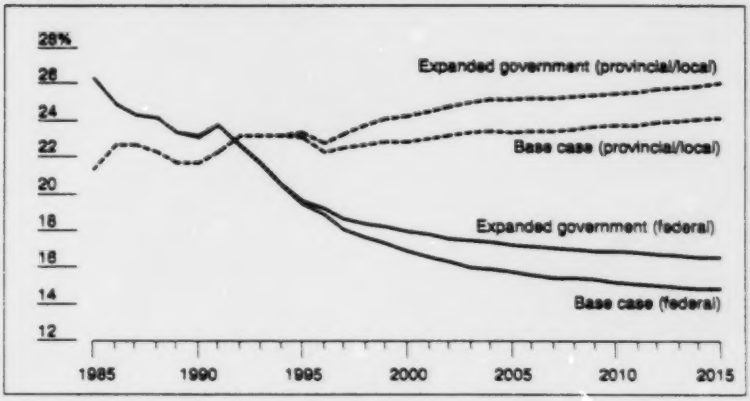
"Expanded-Government" Scenario

Figures 6 and 7 illustrate the budgetary impact of the increase in spending at the federal and provincial/local levels under the expanded-government scenario described in Appendix B, which also assumes the "medium-debt" profile from the base case.

Relative to the base case, federal spending rises by about 0.2 per cent of GDP in 1994-95 and by 1.8 per cent of GDP at the end of the simulation period, primarily because of the extra growth in guaranteed income supplement benefits. At the provincial/local level, expenditures increase by around 0.3 per cent of GDP in 1994-95 and by 1.8 of GDP in 2014-15. This increase is due to (i) the increase in spending needed to raise average welfare benefit rates to 50 per cent of the average wage across all provinces, (ii) the increase in education spending related to the adoption of a national strategy to improve Canadian competitiveness and labour-force adjustment, and (iii) the implementation of a subsidy program for long-term health care. Revenues increase proportionately at both levels of government in order to finance these new expenditures without jeopardizing debt targets.

Figure 6

Federal and provincial/local expenditures under expanded-government scenario,[1] 1985-2015

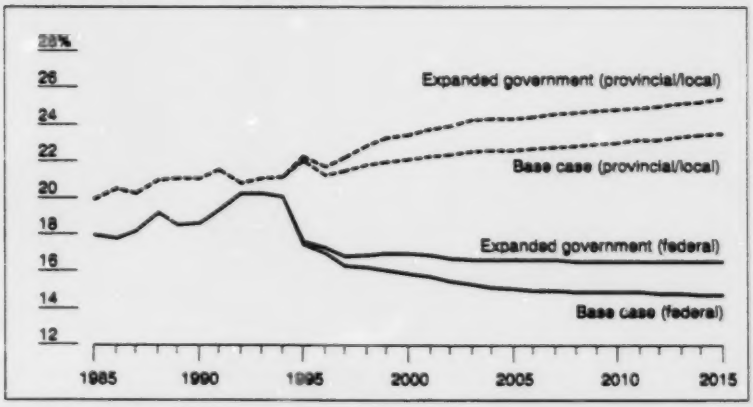


1 As a proportion of GDP.

NOTE Transfers from the federal government to the provincial/local level have been subtracted from provincial/local expenditures to avoid double counting.

Figure 7

Required federal and provincial/local expenditures under expanded-government scenario,[1] 1985-2015



1 As a proportion of GDP.

NOTE This figure reports own-source revenues. Transfers from the federal government to the provincial/local level have been subtracted to avoid double counting.

Overall, the results of this simulation suggest that the breathing space the federal government may enjoy around the mid-1990s may be enough to finance not only its own increased responsibilities under the expanded-government scenario, but also part of the increased responsibilities at the provincial/local level. It must be emphasized once again that this conclusion is based on perhaps overly optimistic macroeconomic forecasts, given the recent performance of the Canadian economy.

Sensitivity Analysis of the "Drop" in Federal Revenues[20]

In order to determine to what extent the results of our base case for federal government finances are conditioned by our macroeconomic scenario, we conducted a number of sensitivity analyses. In particular, we examined the sensitivity of the results to our assumptions concerning interest rates, the rate of real economic growth, and a continuation of the current recession.

Higher-Interest-Rate Scenarios

We carried out two sensitivity analyses for our interest-rate assumptions. The first, termed the "medium-interest-rate" scenario, assumes that interest rates gradually fall as 2000-01 approaches (as in the base case), but effective rates are calculated on the basis of current rates that are 1 percentage point higher than in the base case. In the second analysis, termed the "high-interest-rate" scenario, we assume that the current short-term rate in 1991-92 is maintained throughout the remainder of the simulation period.[21]

The results of the two sensitivity analyses are shown in Figure 8. They suggest that the primary factor in the drop in federal revenues needed to meet expenditure requirements and debt-reduction targets during the simulation period is the assumption that a high tax effort is maintained and that federal fiscal restraint remains in place until 1995-96, rather than the anticipated decline in interest rates in the base case. While the interest-rate decline is clearly responsible for part of the fall in required federal revenues, it turns out to be a relatively minor factor, even at the beginning of the period when the federal debt is very high.

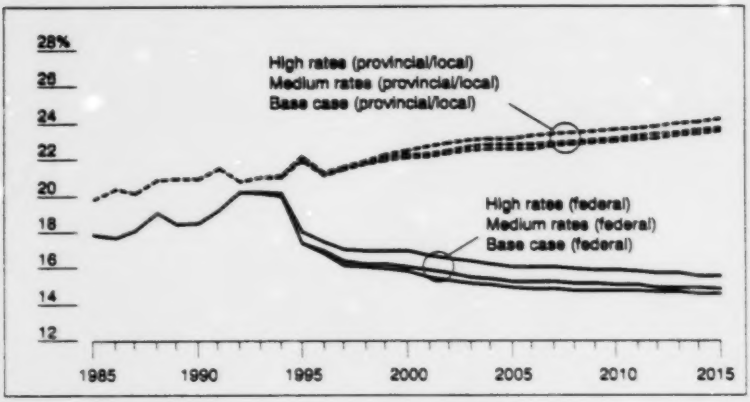
Low-Growth Scenario

This sensitivity analysis alters the assumption of real economic growth used in the base case. In order to establish the sensitivity of the base-case results to the rate of economic growth, we carried out a simulation in which the rate of real GDP growth was one-half a percentage point lower than in the base case.

The results of this analysis indicate that the GDP growth rate has only a minor

Figure 8

Required revenues under the high-interest-rate and medium-interest-rate scenarios,[1] 1985-2015

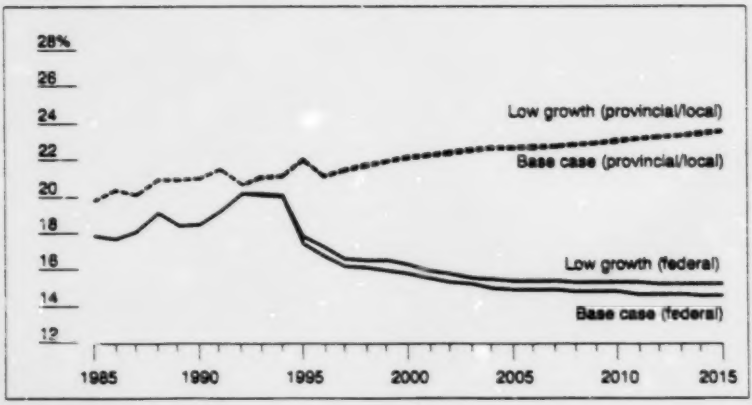


1 As a proportion of GDP.

NOTE This figure reports own-source revenues. Transfers from the federal government to the provincial/local level have been subtracted to avoid double counting.

Figure 9

Required revenues under the low-growth scenario,[1] 1985-2015



1 As a proportion of GDP.

effect on the drop in required federal revenues in 1994-95 and their subsequent profile (Figure 9). It should be noted, however, that this does not significantly alter the relationship between GDP growth and the growth of expenditures and revenues as a whole, which generally continue to evolve in line with GDP. What Figure 9 shows is that the increase in tax effort is due to the fact that a reduction in GDP in order to respect the same debt/GDP target also necessitates a reduction in debt, which in turn means smaller deficits. These results support the conclusion that the federal government may enjoy some budgetary breathing space towards the mid-1990s, because even when substantially lower real growth than in the base case is assumed over the long run, there is little change in the extent of the expected breathing space.

Prolonged-Recession Scenario

This sensitivity analysis investigates the impact of the current recession on the sensitivity of the federal government's budgetary breathing space to the level of debt prevailing when a debt/GDP profile is initially adopted.[22] It is postulated that in 1992-93 and 1993-94 the general revenues of the federal government are 10 per cent lower than in the base case.[23] The effect of this assumption is to increase the federal debt/GDP ratio by 4 percentage points in 1994-95. It is further assumed that, from 1994-95 onward, the federal government redoubles its efforts to bring the federal debt/GDP into line with the base case for the year 1999-2000 (i.e., by targeting a decline in the debt/GDP ratio of 1.7 percentage points a year between 1994-95 and 1999-2000). As Figure 10 indicates, this assumption causes little change in the tax effort required to achieve the debt-reduction objective.

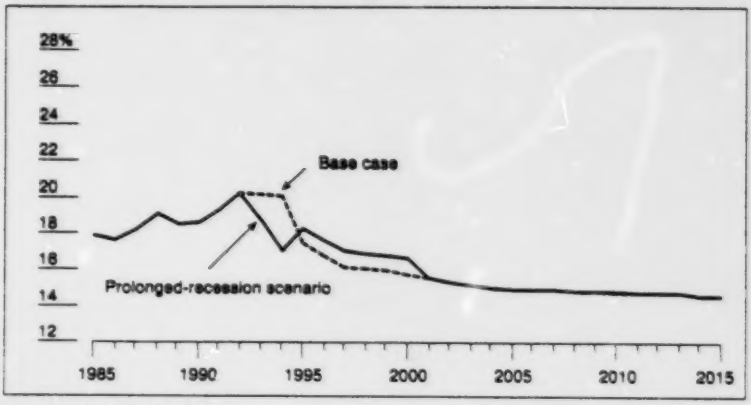
Impacts of Options for Constitutional Reform

It is important to reiterate that the results discussed below represent only an estimate of the "first-round" effects associated with the constitutional scenarios under study. They simply indicate the new tax burden that the residents of each province would initially face following a power shuffle. They do not take account of the effects that these increases (or decreases) in tax effort might have on the various provincial economies in the second, third or *n*th rounds by altering work incentives, savings rates and other variables connected with economic behaviour. In other words, the model does not purport to measure the full effect that the changes under study might ultimately have on governments' financial situation or on the tax burdens of the residents of each province.[24]

Figure 11 shows the effect of various symmetric constitutional reform options on federal and provincial expenditures. In particular, the figure shows that the implementation of moderate decentralization in 1994-95 leads to a shift in net expenditures[25] towards the provincial/local sector of approximately 2.4 per cent of

Figure 10

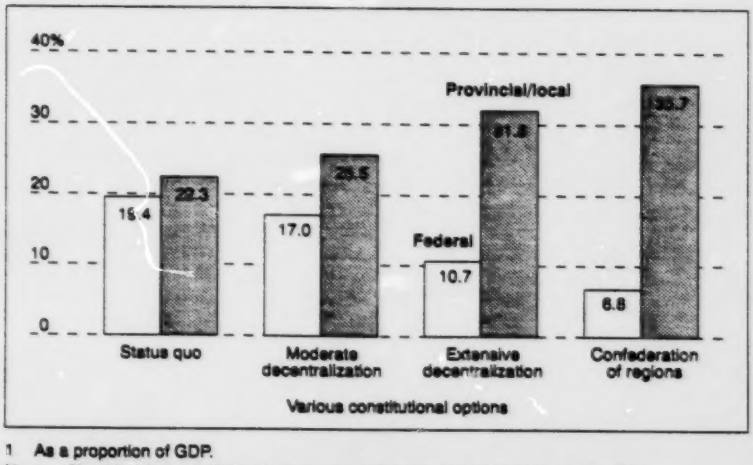
Required federal revenues, prolonged recession,[1] 1985-2015



1 As a proportion of GDP.

Figure 11

Federal and provincial/local expenditures under various constitutional options,[1] 1994-95



1 As a proportion of GDP.

NOTE Transfers from the federal government to the provincial/local level have been subtracted from provincial/local expenditures to avoid double counting.

GDP, assuming the level of spending on services to the public does not change. Under extensive decentralization, the net shift towards the provinces exceeds 8.7 per cent of GDP, and the size of the federal public sector in the economy falls to about one third of the provincial/local sector. Of all the scenarios reported in the figure, the one that reduces the role of the federal government the most is the confederation-of-regions option. Total spending by the provinces rises by 12.6 per cent of GDP relative to the status quo, reaching five times federal expenditures by 1994-95.

The impact of the various constitutional reform options on provincial/local expenditures (and thus on their tax efforts) is very unequal, however. This can be seen from an examination of the total federal and provincial revenues required in 1994-95 to maintain spending on public services at the level of the status quo in each province (Figure 12). Under the status quo, however, total public revenues raised in each province vary from 35.7 per cent of provincial GDP in British Columbia to 42.2 per cent in Saskatchewan, with the spread between the heaviest and lightest tax burdens widening progressively as the extent of decentralization grows.

The tax burdens borne by the residents of each province are different under each option, for two reasons. First, this variation reflects the differences among provinces in the demand (or "need") for the programs currently financed and delivered by the federal government. Second, the variation in the tax burden reflects differences in provincial contributions to federal revenues. Federal income taxes will decline in Canada as a whole as the federal government pulls out of various programs and activities. Provincial income taxes, on the other hand, will rise as the provinces take up their new responsibilities. For the provinces as a whole, the increase in required revenues will exactly equal the decrease in federal income taxes, although this will not be true of each province individually. The less well-off provinces will generally have to increase their tax revenues by a percentage exceeding the reduction in the federal tax revenues raised within their borders, while the reverse will be true of the provinces with stronger fiscal capacities.[26]

Under the moderate decentralization option, therefore, the total revenues required to maintain the level of government services in the less rich provinces will increase slightly (by about 1.9 per cent in Newfoundland, the province most severely affected), despite the automatic increase in equalization payments associated with a more intense provincial/local tax effort. On the other hand, these revenues will decrease slightly in Ontario and Alberta (by 0.7 and 0.2 per cent of GDP, respectively). The gap in tax burdens widens further under the extensive-centralization option, where the increase (relative to the status quo) of the tax burden in Newfoundland climbs to 16.2 percentage points, while the tax burden in Ontario declines by 2.6 percentage points.[27]

The confederation-of-regions options, which adds the elimination of the equal-

ization system to the other expenditure item transfers, proves to have a substantial impact on the gap between the less well-off provinces and their richer counterparts. The spread between the largest and smallest tax burdens reaches 34.5 percentage points.

Figure 12 shows, lastly, the impact of the sovereignty-association scenario. Given the elimination of all implicit and explicit transfers and the assumption of 22 per cent of federal liabilities by Quebec, the total tax burden for residents of that province increases by about 3.6 per cent of its GDP in 1994-95, while tax burdens in the other provinces decline slightly (by about 1 per cent of their GDP, on the average) as a result of the lower federal tax effort associated with the elimination of explicit and implicit transfers to Quebec.

Sensitivity Analysis of Sovereignty-Association Option Results

We also analysed the sensitivity of the results of the sovereignty-association option to different assumptions regarding: (i) how quickly a sovereign Quebec is able to reduce its debt/GDP ratio; (ii) the share of the federal debt that Quebec might assume; and (iii) the imposition of additional risk premiums on new loans taken out by Quebec and Canadian governments (federal, provincial, and local).

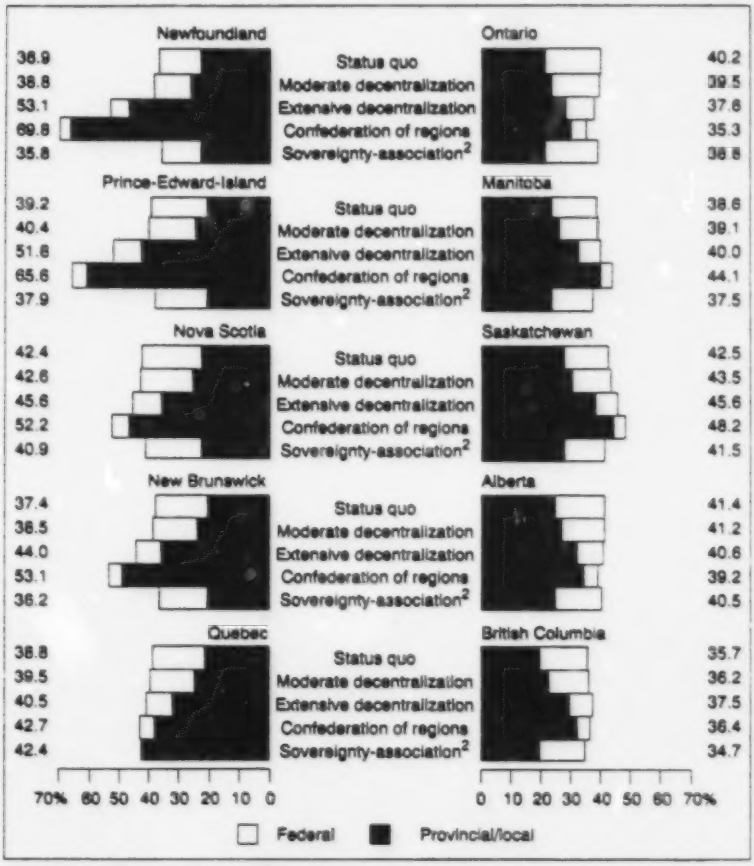
Scenario With a Reduction in Quebec's Debt Under Sovereignty-Association

The simulation of the sovereignty-association option in the base case makes the assumption that Quebec (like the other provinces) adjusts its tax effort so as to maintain a constant debt/GDP ratio from 1992-93 to the end of the simulation period. Although this does not seem unreasonable under the other constitutional options (where Quebec's debt remains at approximately 34 per cent of GDP), it may be preferable to assume under the sovereignty-association option (where Quebec's debt reaches more than 80 per cent of its GDP) that this ratio will decline over time. In this analysis, we calculate Quebec's additional tax effort under sovereignty-association over a long transition period during which Quebec strives to conform to a "reduced-debt" profile (Figure 13). This profile stipulates a reduction of 1.5 per cent a year from 1994-95 onward, bringing Quebec's debt/GDP ratio down to about 50 per cent by the end of the simulation period; this would correspond more or less to the combined federal/provincial/local debt rate of a "nine-province Canada" as of the same date.

The results based on this exercise (Table 4) indicate that Quebec would have to increase its tax effort by 5.1 per cent of GDP in 1994-95 relative to the status quo, compared with 3.6 per cent under the "high-debt" profile of the base case.

Figure 12

Projected government revenues[1] required to maintain the same levels of public spending under various constitutional options, Canada, by province, 1994-95



1 Own-source revenues as a percentage of provincial GDP.

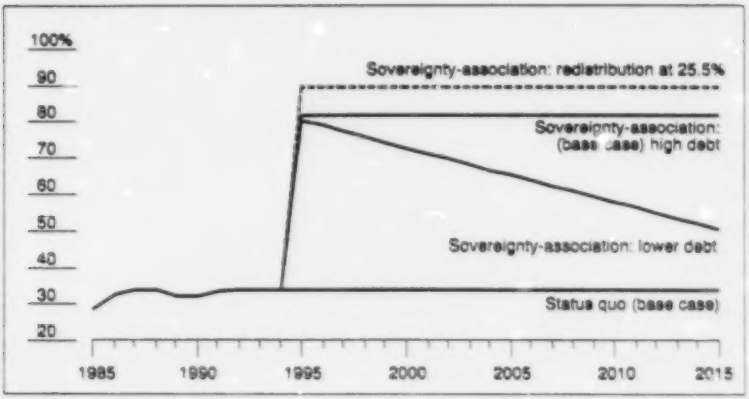
2 Outside of Quebec, required revenues under the sovereignty-association option decline relative to the status quo because of the decline in required federal revenues following the elimination of net federal transfers to Quebec.

Scenario With Debt Redistribution at 25.5 Per Cent

We also assessed the impact of transferring a large share of the federal debt to Quebec under the sovereignty-association option. In the base case we decided to transfer 22 per cent of the federal debt to Quebec in 1994-95, which would bring

Figure 13

Sensitivity analyses of the results of the sovereignty-association scenario: assumptions regarding Quebec's debt/GDP profiles,[1] 1985-2015



1 As a proportion of GDP.

the combined debt of Quebec to about 80 per cent of GDP. For the purposes of the present exercise, we assume that federal liabilities are transferred to Quebec on a pro-rata basis according to that province's share of the Canadian population, (i.e., 25.5 per cent).

With a larger share of the federal debt transferred to Quebec, that province's combined debt climbs to almost 90 per cent of GDP (Figure 13), leading to additional expenditures for Quebec under debt service and, consequently, to a higher tax burden. The results of this analysis (Table 4) indicate that Quebec would have to increase its tax effort by 3.9 per cent of its GDP relative to the status quo, compared with 3.6 per cent in the base case.

Scenario with Additional Risk Premiums for All Provinces and the Federal Government

Lastly, we analysed the sensitivity of the results of the sovereignty-association option to the possibility of additional risk premiums being imposed on borrowing by Quebec, the federal government and the other Canadian provinces. As mentioned earlier in the section on debt service, the sovereignty-association option modelled in the base case already postulates an additional premium on Quebec's borrowing starting in 1994-95, the effective date of the constitutional amendments. This premium is equal to the difference between the current and average rates at that time

Table 4

Tax Burden Under Sovereignty-Association Option: Sensivity Analyses, (Percentage of GDP)

	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2005	2010	2015
Quebec															
Status quo	38.50	39.17	40.45	40.67	41.20	41.34	38.78	38.28	38.24	38.86	38.93	38.82	38.13	38.50	39.03
Sovereignty-association : base case							42.43	41.82	41.77	42.14	42.33	42.36	42.20	42.74	43.48
Sovereignty-association : "reduced-debt" profile							43.93	43.28	43.19	43.49	43.61	43.58	43.17	43.42	43.84
Sovereignty-association : redistribution at 25.5 per cent							42.67	42.04	42.01	42.42	42.63	42.66	42.49	43.03	43.78
Sovereignty-association : high risk premiums						43.15	42.39	42.20	42.43	42.47	42.36	42.20	42.74	43.48	
Nine-province Canada															
Status quo							39.63	37.97	37.51	37.63	37.75	37.71	37.45	37.64	37.97
Sovereignty-association : base case							38.42	36.74	36.39	36.60	36.69	36.62	36.23	36.42	36.74
Sovereignty-association : redistribution at 25.5 per cent							38.40	38.68	36.36	36.55	36.64	36.57	36.18	36.36	36.68
Sovereignty-association : high risk premiums							38.88	37.10	36.65	36.77	36.78	36.62	36.23	36.42	36.74

(which could be as high as 105 basis points above the premiums to which Quebec is traditionally subject).

In the following analysis, we modified borrowing rates to incorporate the additional risk premiums that might be generated by investor uncertainty concerning the sovereignty-association option, both in Quebec and in the rest of Canada. These additional risk premiums are set at 65 basis points for federal government borrowing, 85 basis points for Quebec borrowing (above and beyond the 105 basis points already stipulated), and 50 basis points for the other provinces.[28] These additional premiums begin on the date the 1994-95 constitutional amendments come into effect, gradually disappearing by 1999-2000.

The results of this analysis (Table 4) indicate that Quebec would face an additional tax burden of 4.4 per cent of GDP relative to the status quo, compared with 3.6 per cent of GDP in the base case. The federal government and the nine other provinces would still see a decrease in their tax efforts, as in the base case, but it would be smaller (the overall tax effort falls only by an average of 0.8 per cent of GDP for the "nine-province Canada").

Conclusion

In this paper, we have presented a simulation model for government revenues and expenditures that can be used to forecast the tax effort that will be needed to conform to a particular debt profile while responding to anticipated pressures on the expenditure side. To this end, we constructed a base case where total expenditures are projected to 2014-15 by extrapolating current growth trends under each of the expenditure items. Government debt profiles are initially determined according to anticipated trends in revenues and expenditures (until 1991-92 for the provincial/local level and until 1993-94 for the federal level), after which they are determined exogenously. Thus tax effort levels are determined by the presumed tax structure until 1991-92 for the provincial/local level and until 1993-94 for the federal level, following which they vary according to the specified debt profiles and the presumed pressures on expenditures.

Clearly, the assumptions made concerning government debt profiles strongly influence the simulation results. In the base case, for instance, projections of the federal government's tax effort make the assumption that the federal debt will decline by 1 percentage point a year (as a proportion of GDP), starting in 1993-94. At the provincial/local level, the simulation results for tax effort are based on the assumption that debt levels keep to their 1992-93 levels throughout the simulation period.

In terms of tax effort, the results of the base case simulations indicate that the current tax and fiscal policy framework will allow the federal government to pursue

a relatively ambitious debt-reduction strategy in both the medium and long terms, while still being able to reduce tax levels or increase spending. This phenomenon largely reflects the cumulative effect of budgetary restraint and tax increases in recent years. The robustness of these results was confirmed by sensitivity analyses.

The same simulation model was used to assess the impact of four constitutional reform scenarios on the tax burdens of Canadians in all regions: moderate decentralization, extensive decentralization, a confederation of regions, and asymmetric decentralization in favour of Quebec (sovereignty-association).

Our results showed that decentralization would produce a shift in net expenditures towards the provincial/local level, varying from 2.4 per cent of GDP under moderate decentralization to 8.7 per cent of GDP under extensive decentralization. Among the various scenarios examined in this paper, the role of the federal government is weakened the most under the confederation-of-regions option. Total provincial spending increases by 12.6 per cent of GDP, meaning that by 1994-95 it stands five times higher than federal spending.

The impact of various constitutional reform options on provincial tax effort is very uneven because of differences among the provinces in their demand for services and in their contributions to federal revenues. Under the moderate-decentralization option, the total revenues required to maintain the level of government services increase slightly in the less well-off provinces and decline slightly in Ontario and Alberta. Tax burden gaps widen further under the extensive-decentralization option.

In short, the greater the extent of decentralization and the wider the differences in provincial fiscal capacity, the stronger the potential pressures on the economic union. Either there will be discrepancies in tax rates among the provinces or else disparities in the level of public services. One way to narrow some of the major gaps that appear under the decentralization scenarios would be to increase equalization payments to the disadvantaged provinces. To do so, either the current equalization system would have to be changed or new programs to effect direct interprovincial transfers would have to be developed.

The elimination of the equalization system under the confederation-of-regions option has a substantial impact on disparities between the less well-off provinces and their richer counterparts. Without the equalization system, the decentralization of taxing and spending powers leads to sizeable gaps among the provinces in terms of taxes and services.

Under the sovereignty-association option, the total tax burden borne by Quebec residents in the base case increases by about 3.6 per cent of GDP in 1994-95, while the tax burden declines slightly in the other provinces. However, these results are

very sensitive to assumptions concerning the allocation of federal debt, the size of the extra risk premium imposed on Quebec borrowing, and the selected debt profile.

Lastly, we have stressed the importance of recognizing the inherent limits of our approach when interpreting the results of this study. The tax impacts assessed in this paper are not complete. They illustrate only the immediate balance-sheet results of constitutional change. A comprehensive assessment of the economic impact of constitutional scenarios would have to take into account a host of additional factors, including several other costs and advantages: e.g., the long-term impacts of tax changes, the impact of structural change on the economic union; the dynamic gains that may flow from increased regional autonomy and social cohesion; the potential efficiency gains in the delivery of public services; and the transition costs associated with adapting institutions and markets to structural change. Some progress towards making such an assessment may be found in the 28th Annual Review.

Appendices

A Changes to the Structure of the ESM Model Since the Release of the Annual Review

This appendix lays out the main changes made to the expenditure simulation model (ESM) since the release of the 28th Annual Review. The changes are varied in nature, ranging from the structure of the data base and the equations to the assumptions used for the simulations. Most of the changes have only a marginal impact on the results. While certain corrections have a more noticeable effect, overall the changes and the revised results in no way affect the discussion and conclusions presented in the Review.

1. Quebec's Tax Abatement

Quebec benefits from a special tax abatement, which ensures that part of the transfers the province receives from the federal government under the Canada Assistance Program (CAP) and Established Program Financing (EPF) is ceded in the form of tax points rather than cash payments. Data from the provincial government accounts and the Financial Management System (FMS) take into account only the cash component of transfers to the provinces. Because the data were not adjusted to take the value of tax points into account, the initial simulation results presented in the Review were slightly biased.

As a result of this omission, the results underestimate, in particular, the impact of the decentralization of powers in favour of Quebec. This effect is most evident in the moderate-decentralization scenario, decreasing gradually as the extent of decentralization increases (because the *relative* value of the abatement declines as the amounts subject to decentralization increase). The current version of the model has been modified to correct this oversight.

2. Adjustment of Impact on Provinces of Indirect Federal Taxes

In national accounting, federal revenues derived from indirect taxes are divided among the provinces according to where the products subject to tax were produced. In the Annual Review, federal revenues were allocated among the provinces on this basis. From an economic standpoint, however, the portion of federal revenues derived from indirect taxes should rather be distributed according to the consumption pattern of each province.

In the new version of the model, the portion of indirect federal taxes raised in each province is distributed according the provincial distribution of personal expenditures on goods and services. Given the relatively lower production of the smaller provinces compared with their consumption, the effect of this adjustment

is to increase the shares of federal revenues from the smaller provinces and to decrease the shares of the large provinces.

3. Modifications to Modelling of Equalization

Two changes were made to the way equalization is modelled in the new version of the ESM.

i) The modelling of equalization takes into account budgetary restraint measures to ensure that the growth of total equalization payments does not exceed the growth of national GDP in the coming years. This assumption is discarded as of 1994-95, leading to a one-time increase of 8 per cent in equalization payments in that fiscal year. The initial version of the model assumed that the increase in equalization payments affected all recipient provinces proportionately. The new version takes into account the fact that "cutbacks" affect each province differently (surplus equalization rights above the ceiling are withdrawn from each province in proportion to its share of the total population of all recipient provinces). Consequently, the one-time increase in 1994-95 should reflect the relative severity of cutbacks in each province. The following table shows the one-time increases applicable to recipient provinces in 1994-95 in the new version of the ESM.

Equalization Adjustments in 1994-95

	Per cent
Newfoundland	3.8
Prince Edward Island	4.1
Nova Scotia	6.2
New Brunswick	5.0
Quebec	11.0
Ontario	0.0
Manitoba	7.9
Saskatchewan	12.7
Alberta	0.0
British Columbia	0.0
Average	8.0

ii) Under the various constitutional reform options, the provinces assume responsibility for certain expenditures that were formerly financed by the federal government. As a result, the average tax effort of the provinces increases, leading to an automatic increase in equalization payments from the federal government. The initial version of the model arbitrarily assumed that equalization payments would

increase by 7 cents for each dollar of expenditures transferred to the provinces. Subsequent improvements to the model have made it possible to estimate endogenously the "compensatory" effect of the equalization formula. The compensatory effect in the present version of the model works out to approximately 5 cents for each dollar of federal expenditures transferred to the provinces.

4. Average Effective Borrowing Rates

There was an error in the input data used in the simulation carried out for the Review. To correct it, average effective borrowing rates in all provinces have been revised upward (by about 0.9 percentage points) for 1989-90 and the following fiscal years. The effect of this new assumption is a general increase in the implicit tax rates required to finance projected expenditures in all scenarios.

5. Calculation of the Liabilities of the Nine Other Provinces Under the Sovereignty-Association Scenario

Federal liabilities are allocated to the provinces according to data from the provincial national accounts. The sum of all provincial shares must equal 1. Following the transfer of the appropriate share of federal liabilities to Quebec under the sovereignty-association scenario, the nine other provinces' shares of remaining federal liabilities must be adjusted upward to ensure that each province's amount of liability is the same as in the status quo.

This adjustment was only partial in the version of the ESM used in the Review, as a result of a specification error in the equation for allocating federal liabilities. Accordingly, the results reported in the Review underestimate federal expenditures under the sovereignty-association option (and so overestimate the extent of the decline in tax effort in the nine other provinces under the same option).

Appendix B

Table B-1

Summary of redistribution of federal (F) and provincial/local (P) spending responsibilities under various constitutional options

Expenditure item[1]	Status quo	Moderate decentralization	Extensive decentralization	Confederation of regions	Sovereignty-association
I. Health care programs					
Health care (a,p)[2]	P F (transfers and some direct expenditures of secondary importance)	P	P	P	P (Quebec) Status quo elsewhere
II. Education and labour-market programs					
Primary and secondary education (a,p)[2]	P F (transfers and some direct expenditures of secondary importance)	P	P	P	P (Quebec) Status quo elsewhere
Postsecondary education (a,p)[2]	P F (transfers and some direct expenditures of secondary importance)	P	P	P	P (Quebec) Status quo elsewhere
Manpower training (excluding UI training benefits) (p)	P F	P	P	P	P (Quebec) Status quo elsewhere

Unemployment insurance (a)	F	F	P	P	P (Quebec) Status quo elsewhere
III. Elderly benefits programs					
Old Age Security (a)	F	F	P	P	P (Quebec) Status quo elsewhere
Guaranteed Income Supplement (a)	F	F	P	P	P (Quebec) Status quo elsewhere
Spouse's Allowance (a)	F	F	P	P	P (Quebec) Status quo elsewhere
IV. Child benefits programs					
Family allowances[3] (a)	F F	F F	P	P	P (Quebec) Status quo elsewhere
Child tax credits (a)	F F	F F	P	P	P (Quebec) Status quo elsewhere
Child care[4] (p)	P F	P F	P	P	P (Quebec) Status quo elsewhere
V. Social welfare programs					
Social assistance (a,p)[2]	P F (transfers and some direct expenditures of secondary importance)	P	P	P	P (Quebec) Status quo elsewhere

Other social welfare services (p)	P F (transfers and some direct expenditures of secondary importance)	P	P	P	P (Quebec) Status quo elsewhere
VI. "Sectoral" policies					
Regional development, natural resources, and culture (p)	P F	P F	P	P	P (Quebec) Status quo elsewhere
Transportation and communication (p)	P F	P F	P F	P F	P (Quebec) Status quo elsewhere
Environment (p)	P F	P F	P F	P F	P (Quebec) Status quo elsewhere
VII. Categories under exclusive federal jurisdiction					
Equalization and other general-purpose transfers (a)	F	F	F	none	none (Quebec) Status quo elsewhere
Native affairs (o)[5]	F	F	F	P	P (Quebec) Status quo elsewhere
National defence (y)	F	F	F	F	P (Quebec) Status quo elsewhere
Veterans' benefits (y)	F	F	F	F	P (Quebec) Status quo elsewhere
Official Development Assistance (y)	F	F	F	F	P (Quebec) Status quo elsewhere

VIII. Other expenditure categories					
Housing (p)	P	P	P	P	P (Quebec)
	F	F			Status quo elsewhere
Justice and law enforcement (p)	P	P	P	P	P (Quebec)
	F	F	F	F	Status quo elsewhere
Other expenditures (p)	P	P	P	P	P (Quebec)
	F	F	F		Status quo elsewhere

Notes :

1. The letters in parentheses following expenditure items indicate the provincial allocation rule applied to federal expenditures under this category (SeeChapter 3) :
   - a = allocated by extrapolating observed allocation of federal expenditures;
   - p = allocated by pro-rating on the basis of provincial population;
   - y = allocated by pro-rating on the basis of provincial GDP;
   - o = some other allocation rule.
2. Federal-provincial transfers are allocated according to rule a and direct federal expenditures (which are considerably smaller) according to rule p (see Note 1 above).
3. Provincial family allowance programs are not modelled separately but are implicitly included in "other" provincial expenditures.
4. The results of modelling concern only additional expenditures. Current federal spending on child care is divided among several other expenditure items, as noted in the table.
5. The results of modelling cover only additional expenditures. Current federal spending on Native affairs is divided among several other expenditure items, as noted in the table. Federal expenditures are pro-rated on the basis of the provincial shares of the Native population.

Appendix C

Table C-1

Detailed assumptions for the base case and the "expanded-government" scenario

Expenditure item	Base case	"Expanded-government" scenario
I. Health care programs		
Health care	Growth of unit costs of provincial/local expenditures 1 percentage point faster than provincial per-capita GDP. Growth of direct federal expenditures in line with GDP (subject to federal budgetary restraint measures). Elimination of "cash" transfers to Quebec in 1997-98 and to other provinces in 2002-03	Same assumptions as in the base case *plus* implementation (phased in from 1994-95 to 1998-99) of a subsidy program for chronic patients at the provincial/local level, covering about half of current private expenditures on specialized care. This translates into a 10-per-cent increase over base-level provincial/local expenditures from 1994-95 on.
II. Education and labour-market programs		
Primary and secondary education	Growth of unit costs of provincial/local expenditures in line with provincial per-capita GDP. Growth rate of direct federal expenditures in line with GDP (subject to federal budgetary restraint measures).	Same assumptions as in the base case *plus* a 10-per-cent increase over base-level provincial/local expenditures (phased in from 1994-95 to 1998-99), a new emphasis on the fight against illiteracy, and the adoption of a national strategy to foster competitiveness.

Postsecondary education	Growth of unit costs of provincial/local expenditures in line with provincial per-capita GDP. Growth rate of direct federal expenditures in line with GDP (subject to federal budgetary restraint measures). Elimination of "cash" transfers to Quebec in 1997-98 and to other provinces in 2002-03.	Same assumptions as in the base case *plus* a 10-per-cent increase over base-level provincial/local expenditures (phased in from 1994-95 to 1998-99) as a result of the adoption of a national strategy to foster Canadian competitiveness and encourage workforce adjustment.
Manpower training (excluding UI training benefits)	Growth of unit costs of provincial/local expenditures in line with provincial per-capita GDP. Growth of direct federal expenditures in line with GDP rate (subject to federal budgetary restraint measures).	Same assumptions as in the base case *plus* a 10-per-cent increase in base-level provincial/local expenditures as described under postsecondary education.
Unemployment insurance	Gradual increase in UI training benefits, which will reach the current statutory maximum of 15 per cent of total benefits in all provinces by 1994-95. For other UI benefits, growth of unit costs of provincial/local expenditures in line with provincial per-capita GDP, adjusted according to changes in unemployment levels. Premium rate adjusted to ensure that premiums exactly equal benefits for all fiscal years from 1992-93 to the end of the simulation period.	For UI training benefits, an additional across-the-board increase of 15 per cent in benefits (bringing them to 30 per cent), phased-in to 1999-2000. For other UI benefits, same assumptions as in the base case. For premium rates, same assumptions as in the base case.

III. Elderly benefits programs		
Old Age Security	Growth of unit costs in line with CPI.	Base case
Guaranteed Income Supplement	Growth of unit costs in line with CPI *plus* an adjustment factor (-1 per cent a year) to reflect the maturing of CPP/QPP and the private retirement savings system.	Growth of unit costs in line with per-capita GDP rather than CPI. Same adjustment factor as in the base case to reflect the maturing of CPP/QPP and the private retirement savings system.
Spouse's Allowance	Growth of unit costs in line with CPI *plus* an adjustment factor (-2 per cent a year) to reflect the maturing of CPP/QPP and the private retirement savings system.	Growth of unit costs in line with per-capita GDP rather than CPI. Same adjustment factor as in the base case to reflect the maturing of CPP/QPP and the private retirement savings system.

IV. Child benefits program		
Family allowances	Growth of unit costs in line with the "partial deindexation" formula (CPI minus 3 per cent) throughout simulation period.	Same as the base case until 1995-96; growth of unit costs in line with per-capita GDP thereafter.
Child tax credits	Growth of unit costs in line with per-capita GDP.	Base case.
Child care	Overall growth of current provincial/local expenditures implicitly in line with GDP. No federal expenditures in this category.	Same growth rate as in the base case *plus* an increase of $400 million in annual expenditures over the base level to reflect the implementation of the 1987 federal daycare strategy (shared equally by the federal government and the provinces, pro-rated on the basis of provincial population aged 4 years and younger).
V. Social welfare programs		
Social assistance	Growth of unit costs of provincial/local expenditures in line with provincial per-capita GDP. Transfers to "rich" provinces and "direct" federal expenditures: growth of total federal expenditures in line with GDP (subject to federal budgetary restraint measures). Transfers to other provinces: growth of total federal expenditures in line with GDP.	Increase in provincial/local expenditures in order to raise average social assistance benefit rates to 50 per cent of the average wage in all provinces. (The increase is assumed to be equal to a variation of about 67 per cent, phased in over a 10-year period from 1994-95 to 2003-04; current benefit rates are estimated to be 30 per cent of the average wage.)

Other Social Welfare Services	Overall growth of provincial/local expenditures in line with provincial GDP. Overall growth of federal expenditures in line with GDP (subject to federal budgetary restraint measures).	Base case.
VI. **Sectoral policies** Regional development, natural resources, and culture	Overall growth of provincial/local expenditures in line with provincial GDP. Overall growth of federal expenditures in line with GDP (subject to federal budgetary restraint measures).	Base case.
Transportation and communication	Overall growth of provincial/local expenditures in line with provincial GDP *plus* an increase of $600 million in provincial/local expenditures phased in over 10 years (starting in 1994-95) for the projected renewal of transportation infrastructure. Overall growth of federal expenditures in line with GDP (subject to federal budgetary restraint measures).	Base case.
Environment	Overall growth of provincial/local expenditures in line with provincial GDP *plus* an increase of $300 million in provincial/local expenditures phased in over 10 years (starting in 1994-95) for the projected renewal of anti-pollution infrastructure (principally water and sewage-treatment facilities). Overall growth of federal expenditures in line with GDP (subject to federal budgetary restraint measures).	Increase over the base case in expenditures on the environment of $500 million for the federal government and $1 billion for the provincial governments, phased in from 1995-96 to 1999-2000.

VII. Categories of exclusive federal jurisdiction		
Equalization and other general-purpose transfers	No change in current equalization formula, but current restrictions on overall growth of equalization payments (limiting them to cumulative GDP growth) lifted as of 1994-95, resulting in a one-time increase of approximately 8 per cent.	Current "five-provinces" standard replaced by "Ontario" standard, with additional equalization payments in 1994-95 aimed at bringing the fiscal capacities of all provinces into line with Ontario's (which is currently 9.5 per cent above the national average).
Native affairs	Settlement of aboriginal land claims: $10 billion spread over 10 years from 1994-95 to 2003-04.	Base case.
	Other expenditures: overall growth in line with GDP, plus three quarters of 1 per cent over the entire simulation period.	
National defence	Overall growth of expenditures in line with GDP (subject to federal budgetary restraint measures), but a 15-per-cent decrease in base-level expenditures to reflect the "peace dividend" during the period 1994-95 to 2003-04.	Overall growth of expenditures in line with GDP (subject to federal budgetary restraint measures).
Veterans' benefits	Overall growth of expenditures in line with GDP minus 4 per cent over the entire simulation period.	Base case.
Official Development Assistance (ODA)	Current restrictions on growth of ODA (maximum growth of 3 per cent a year) maintained until 1995-96; maintenance of then-current ODA/GDP ratio thereafter.	Base case until 1995-96; thereafter, increases in the proportion of GDP devoted to ODA, from approximately 0.44 per cent in 1995-96 to 0.8 per cent in 2004-05.

VIII. Other expenditure categories		
Housing	Overall growth of expenditures in line with GDP (federal level) and provincial GDP (provincial/local level).	Base case.
Justice and law enforcement	Overall growth of provincial/local expenditures in line with provincial GDP.	Base case.
	Overall growth of federal expenditures in line with GDP (subject to federal budgetary restraint measures).	
Debt service	Endogenous values varying according to size of federal and provincial/local debt and average effective borrowing rates.	Base case.
Other expenditures	Overall growth of provincial/local expenditures in line with provincial GDP.	Base case.
	Overall growth of federal expenditures in line with GDP (subject to federal budgetary restraint measures).	

IX.	**Revenues and debt**		
	UI premiums	Increases in premiums in line with GDP and announced premium rate changes until 1992-93; changes to ensure that premiums equal benefits in all fiscal years thereafter.	Base case.
	Seigniorage	Calculated as the year-to-year difference in the money supply, which is assumed to grow in line with GDP.	Base case.
	Taxation of interest on government debt	Endogenous values varying according to size of federal and provincial/local debt service (see above), but with changes in tax effort to conform to prescribed debt/GDP profiles.	Base case.
	General revenues (excluding UI premiums, taxation of interest on government debt, and seigniorage)	Growth of revenues during recovery and period of partial deindexation as projected under the macroeconomic base-case scenario until 1995-96; growth in line with GDP (or provincial GDP) thereafter; additional endogenous changes in tax effort as needed to conform to prescribed debt/GDP profiles (see below).	Base case.

Debt/GDP Ratio	For provinces other than Ontario, tax effort is adjusted to maintain the debt/GDP ratio at its 1991-92 level throughout the simulation period. For Ontario, debt increases in line with the forecasts of the last provincial budget until 1993-94; tax effort adjusted to maintain the debt/GDP ratio at its 1993-94 level thereafter. For the federal government, the debt/GDP ratio is endogenous until 1993-94; thereafter, three different scenarios are considered: • "High-rate scenario": tax effort is adjusted to ensure that the debt/GDP ratio remains at its 1993-94 level until the end of the simulation period; • "Medium-rate scenario": tax effort is adjusted to ensure that the debt/GDP ratio declines by 1 percentage point each fiscal year (falling to under 30 per cent by 2014-15); and • "Low-rate scenario": tax effort is adjusted to ensure that the debt/GDP ratio declines by 2 percentage points each fiscal year (falling to under 10 per cent by 2014-15).

D Sources of Input Data and Structure of Main Equations

Input Data Sources

Basic Expenditures and Revenues

In most cases, projections of expenditure and revenue items are extrapolated from observations drawn from the historical series provided by Statistics Canada's System of Government Financial Management Statistics (FMS). The simulation periods for these expenditure/revenue items begin at the point where historical series are no longer available, usually 1988-89. For certain expenditure/revenue categories no historical data were available, however; in these cases, base observations were constructed using allocation rules or some other estimation method. In such cases, the simulation period begins in 1984-85.[29] Given that the ESM covers eleven governments and some thirty expenditure and revenue items (some of which are broken down further according to whether they represent intergovernment transfers or direct expenditures), we require several hundred series of expenditure/revenue items, most of which are available on CANSIM. The others were obtained through the cooperation of the Public Institutions Division of Statistics Canada.

In addition, some data series had to be modified in order to conform more closely to economic and fiscal reality. In particular, two modifications were made to historical data on total government revenues:

- In the present version of the ESM,[30] data on total government revenues were adjusted in order to change the provincial allocation rule for the indirect tax component. FMS data currently allocate these revenues to the province in which they were raised (which, in the case of manufactured goods, is typically the province of manufacture). Yet, logically, the impact of these taxes is ultimately felt by the consumer, not the manufacturer. Thus we decided to allocate this component pro-rated on the basis of total provincial consumption.

- The second adjustment to total revenues concerns the handling of Quebec's "special" tax abatements. Since FMS data do not take into account the "special" tax abatements enjoyed by Quebec under the Canada Assistance Plan (CAP) and Established Program Financing (EPF), provincial/local revenues in Quebec and federal revenues from that province had to be adjusted by decreasing or increasing the revenue amounts, as appropriate, by the value of the additional income tax points ceded to Quebec, particularly under CAP and the various federal-provincial arrangements for health care financing (including arrangements under EPF).

These abatements amounted to $1.9 billion in 1989-90 – 1.6 per cent of total federal government revenues and 4.9 per cent of the revenues of Quebec and its municipalities. At the same time, we increased federal expenditures in Quebec (and decreased provincial/local expenditures) in the categories of health care and social welfare by a corresponding amount.

Expenditure Data by Age and Sex

The detailed modelling of the demographic components for certain expenditure items (i.e., health care, education, manpower training, social assistance, and unemployment insurance) requires data on unit costs for each age/sex group in each province. In most cases, we relied on the unit-cost data that was used in the Council's immigration project.[31] The two main exceptions are unemployment insurance and manpower training. In the first instance, we calculated unit costs from Revenue Canada data on employee benefits and premiums.[32] In the second, we used the demographic breakdown developed at McMaster University for the project on "Models of the Economic-Demographic System."[33]

Generally speaking, the data reflect (or have been adjusted to reflect) expenditures in these expenditure categories in 1985. In most cases, however, breakdowns by province were not available. Where they were available, they were used; where they were not, we used national average unit costs for the year in question.

Structure of the Main Equations[34]

Developing the specification of simulation equations for each of the expenditure items generally involved three steps:

- determining the *expenditure (or revenue)* base from which growth values are extrapolated;
- determining a *growth index* by which the expenditure or revenue base is multiplied to reflect the major factors affecting developments in that expenditure or revenue category; and
- combining the base and the growth index and incorporating additive or multiplicative factors to adjust for variations in revenue and expenditure trends (relative to base trends) in order to derive an *expenditure or revenue* extrapolation equation, particularly for the purposes of the expanded-government scenario.

Expenditure Equations

In addition, the nature of the expenditure extrapolation equations varies according to whether or not the expenditure items involved are suited to the detailed modelling of a demographic component (in other words, the simulation of an item according to detailed breakdowns of unit costs and demographic forecasts by age/sex groups).

In cases where there are no data by province for a particular expenditure item, or when the breakdowns that are available are unsuitable, a variable must be added to represent the provincial "shares" of these expenditures. These "shares" may then be used to "allocate" federal expenditures among the provinces by dividing up total federal expenditures in that category among the provinces on that basis under the various constitutional reform options.

It must be noted that this allocation does not necessarily correspond to the observed level of federal expenditures in each province in the category in question. In other words, instead of relying on a "balance-sheet" approach for allocating federal expenditures among the provinces under various constitutional reform options – an exercise that would yield highly questionable allocation rules for the kind of calculations for which the ESM was designed,[35] we wanted allocation rules that could estimate what expenditures the provinces would likely have to assume under a given budget item should the federal government assign them responsibility for that item.[36]

In practical terms, the ESM is based on a series of simple and logical rules for allocating federal expenditures. Generally speaking, federal transfers are still allocated to the other levels of government (EPF, CAP, equalization) and to individuals (UI benefits, family allowances, Old Age Security, and other benefits for the elderly and children) on the basis of the current distribution among the provinces.[37] In some cases (notably, categories involving sizeable expenditures on goods and services), the theoretically ideal allocation rule must make allowance for the "need" for the expenditures in question in various provinces. For instance, British Columbia would logically have more of a vested interest in maintaining federal expenditures in the area of forestry research than Prince Edward Island or Saskatchewan, since forestry is only a relatively minor activity in the latter provinces. (And, obviously, the exact opposite is true of spending on agriculture.)

It would have been difficult to rely on a "need"-based allocation rule, since most of the expenditure items are grouped in broad categories like "economic development and sectoral policies" and "other expenditures." Thus we generally allocated federal expenditures arbitrarily by pro-rating them on the basis of provincial population.[38] While this is not an ideal solution, it is probably not too unrealistic to assume that any disproportionate size of federal expenditures in a given category in a given province would be counterbalanced in other categories for other

provinces.[39] And, in all likelihood, the rule is only truly arbitrary for a small proportion of total federal government expenditures.[40]

Lastly, it should be noted that the ESM assumes that the provinces as a whole spend the same amount after constitutional reform as the federal government does currently. This implicitly assumes that there are no economies of scale in the federal government's current spending, that unproductive overlaps in federal and provincial spending are not eliminated, and that the priorities assigned to the various expenditure items do not change.[41]

Revenue Equations

As was the case for several expenditure categories, we had to develop a provincial allocation rule for general federal revenues in order to be able to determine the contribution made by the residents of each province to general federal revenues. Since FMS data on federal revenues are not broken down by province, we had to rely on data from provincial national accounting systems to derive an estimate of the relative contributions made by the residents of the various provinces.

In modelling revenues from the taxation of interest on government debt, two components were distinguished: (i) the effective interest rate on securities issued by both levels of government; and (ii) the corresponding levels of federal and provincial/local liabilities.[42] As with general federal revenues, FMS data do not break down federal liabilities by province. Once again we relied on data from provincial national accounting systems to derive a provincial allocation rule. The allocation rule is based on debt-service payments made by the federal government to the holders of such securities residing in each province.

It must be stressed, however, that this is not the same kind of "allocation" as that discussed above for expenditures. The purpose in allocating liabilities is *not* to identify how the federal debt-service burden should be distributed following possible constitutional reform, but rather to determine how interest revenues on the federal debt are distributed among the provinces. In particular, this allows us to gauge the extent of revenues raised by the provinces from the taxation of interest on the federal debt.

Thus the allocation rule for *federal* liabilities is far from ideal, since the allocation of these liabilities in the provincial economic accounts likely reflects where the securities were *issued*, which may be quite different from where they are actually *held*. Moreover, we have no hard data on the provincial allocation of federal/provincial liabilities, and the Canadian holders of this debt are scattered across the country. Given the lack of data for estimating this distribution, we were forced to simply assume that, overall, liability ownership across provinces follows the same pattern as issues, which undoubtedly tends to underestimate the share of the "stockholder" provinces, particularly Ontario.

Appendix E

Table E-1

Revenues and expenditures of federal government and provincial/local governments, base case, 1985-2015 (Percentage of GDP)

	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2005	2010	2015
FEDERAL GOVERNMENT REVENUES AND EXPENDITURES															
Revenues															
Total general revenues	15.84	16.61	17.39	17.86	17.79	17.64	15.09	14.65	14.15	14.09	14.04	13.87	12.96	12.75	12.59
Taxation of interest on government debt	0.47	1.90	1.95	1.90	1.82	1.70	1.31	1.25	1.14	1.11	1.06	0.98	0.77	0.63	0.52
Other general revenues	11.09	14.64	15.34	15.71	15.71	15.69	13.56	13.17	12.78	12.79	12.79	12.72	12.03	11.97	11.93
Seigniorage	4.29	0.07	0.10	0.26	0.27	0.24	0.23	0.23	0.22	0.20	0.18	0.17	0.16	0.15	0.14
UI premiums	2.06	1.95	1.89	2.35	2.39	2.37	2.33	2.22	2.11	2.06	2.03	2.00	2.05	2.09	2.10
Total budgetary revenues	17.90	18.56	19.29	20.21	20.18	20.01	17.43	16.88	16.25	16.15	16.07	15.87	15.01	14.84	14.69
Expenditures															
Health care	1.74	1.32	1.30	1.23	1.16	1.10	1.05	1.00	0.85	0.69	0.61	0.53	0.26	0.26	0.26
Education															
Total	0.69	0.51	0.50	0.48	0.45	0.43	0.41	0.39	0.33	0.27	0.25	0.22	0.11	0.11	0.11
Primary and secondary education	0.12	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06
Postsecondary education	0.58	0.43	0.42	0.40	0.38	0.36	0.34	0.32	0.27	0.21	0.18	0.15	0.05	0.05	0.05
Training															
Total	0.17	0.14	0.22	0.28	0.33	0.38	0.43	0.41	0.39	0.38	0.38	0.38	0.38	0.39	0.39
Training programs	0.12	0.10	0.10	0.09	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
UI training benefits	0.05	0.05	0.12	0.19	0.25	0.29	0.35	0.33	0.32	0.31	0.30	0.30	0.31	0.31	0.32
UI benefits (excluding training)	2.31	1.96	2.46	2.42	2.29	2.08	1.96	1.89	1.79	1.75	1.73	1.70	1.74	1.77	1.79

Elderly benefits program															
Total	2.58	2.49	2.58	2.54	2.48	2.42	2.38	2.32	2.27	2.23	2.20	2.18	2.08	2.04	2.03
Old Age Security	1.86	1.80	1.87	1.85	1.81	1.78	1.75	1.71	1.68	1.66	1.64	1.63	1.58	1.56	1.57
Guaranteed Income Supplement	0.66	0.62	0.63	0.62	0.60	0.58	0.57	0.55	0.53	0.52	0.51	0.50	0.46	0.43	0.42
Spouse's Asllowance	0.06	0.08	0.08	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04
Child benefits programs															
Total	0.88	0.68	0.68	0.65	0.63	0.61	0.59	0.57	0.55	0.54	0.53	0.51	0.46	0.42	0.40
Family allowances	0.54	0.40	0.40	0.37	0.35	0.32	0.30	0.28	0.26	0.25	0.23	0.22	0.17	0.13	0.10
Child tax credits	0.34	0.28	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.30	0.30	0.30
Additional expenditures on child care	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Social welfare															
Total	1.39	1.14	1.14	1.11	1.08	1.05	1.03	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00
Social assistance	1.12	0.90	0.90	0.88	0.86	0.85	0.84	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.81
Other social welfare services	0.27	0.24	0.24	0.23	0.22	0.21	0.20	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Regional development and sectoral policies	2.71	1.35	1.34	1.27	1.20	1.14	1.09	1.04	1.04	1.04	1.04	1.04	1.03	1.03	1.03
Transportation and communication	0.84	0.59	0.58	0.55	0.52	0.49	0.47	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Environment	0.11	0.08	0.08	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Housing	0.47	0.27	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Justice and law enforcement	0.53	0.43	0.43	0.40	0.38	0.36	0.35	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Expenditures of exclusive federal jurisdiction															
National defence	1.93	1.60	1.58	1.50	1.42	1.35	1.33	1.31	1.29	1.27	1.25	1.23	1.15	1.15	1.15
Veterans' benefits	0.33	0.25	0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.18	0.17	0.14	0.11	0.09

Official Development Assistance	0.46	0.53	0.53	0.51	0.49	0.47	0.46	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Equalization and other general-purpose transfers	1.43	1.22	1.22	1.22	1.22	1.22	1.30	1.30	1.29	1.28	1.28	1.27	1.25	1.22	1.20
Additional expenditures on Native Canadians	0.00	0.00	0.00	0.01	0.01	0.01	0.13	0.12	0.12	0.11	0.11	0.11	0.03	0.03	0.03
Debt service	5.08	6.05	6.15	5.58	5.18	4.68	3.94	3.91	3.53	3.44	3.32	3.10	2.64	2.26	1.92
Miscellaneous other expenditures	2.61	2.45	2.43	2.30	2.17	2.07	1.98	1.89	1.88	1.88	1.88	1.88	1.88	1.87	1.87
Total budgetary expenditures	26.27	23.08	23.74	22.62	21.56	20.41	19.45	18.90	18.09	17.63	17.30	16.87	15.70	15.22	14.80
Budget deficit	-9.09	-4.38	-4.45	-2.41	-1.38	-0.41	-2.02	-2.03	-1.84	-1.48	-1.24	-1.00	-0.69	-0.38	-0.11
Net debt	-45.85	-54.53	-57.45	-55.95	-53.36	-50.34	-49.34	-48.34	-47.34	-46.34	-45.33	-44.33	-39.34	-34.34	-29.34
Gross domestic product ($ millions)	441780	646962	688822	717711	772486	825528	878270	935721	994093	1049095	1102279	1153121	1437368	1761786	2132819

Notes

1 The analytical model that is the subject of this paper draws its inspiration from an approach proposed by Richard Roy in a paper prepared for the Economic Council of Canada entitled "Simple Models of the Dynamics of Deficits and Debt" [1991].

2 The "direct" federal expenditures on training that would be transferred to the provinces consist primarily of purchases of educational programs from post-secondary institutions under the "institutional" component of federal industrial training programs, as well as subsidies paid directly to firms for on-the-job training.

3 A description of the expenditure and revenue items used for FMS statistics may be found in *The System of Government Financial Management Statistics* (Statistics Canada Cat. 68-507, occasional).

4 In particular, the Unemployment Insurance Act stipulates a uniform replacement rate up to a maximum level of insurable earnings, which is expressed as a percentage of the average industrial wage. Since wages generally follow the growth of average productivity and inflation, we felt it was reasonable to assume that unit benefits would evolve more or less in line with per-capita GDP.

5 It should be noted that this premium does not apply to the other provinces nor to the federal government, since they do not assume any new debt under the sovereignty-association option. For an assessment of the possible impact of additional risk premiums on the federal government and the other provinces under this option, see the section on sensitivity analyses.

6 Note that this implies, in particular, that we make no distinction between, on the one hand, revenues for which there is an obvious link between their growth and economic growth (e.g., income taxes and indirect taxes) and, on the other, revenues for which there is no such link (such as royalties and other revenues derived from the ownership of natural resources). Consequently, the model does not allow us to accurately simulate the effect of various shocks on particular tax rates. This means that it cannot identify, for example, the increase in personal income tax rates required to finance additional health-care expenditures, nor the number of "tax points" that the federal government might have to cede to the provinces to compensate for its transferring responsibility for a particular item.

7 The first of these two components had to be modelled separately because it was tied more closely to the public debt and interest rates than to economic

growth. It seemed more logical to take for granted that the other revenue categories would generally follow the growth of the working-age population (in the case of UI premiums) or economic growth (in all other cases), so that it would be consistent to simulate them at the aggregate level according to population or GDP.

8 Because these revenues are derived from personal and corporate income taxes, we assume that they will be affected in the same way as "other" general revenues when governments adjust their tax efforts.

9 The transition period is needed because of the substantial deficit that developed in the unemployment insurance fund during the last recession. As envisioned here, the transition would reflect the premium rate increases announced in the 1989 and 1991 budgets and, thereafter (i.e., starting in 1993-94), changes in the premium rate as required to balance the fund.

10 In the "medium-rate" scenario, effective 1994-95 the federal government adopts a budget policy aimed at reducing the debt/GDP ratio to about 30 per cent by 2014-15 – which is the level that generally prevailed during the early 1980s. In the "low-ratio" scenario, the federal government's budget policy is tightened further in order to bring the debt/GDP ratio down to about 10 per cent (the lowest level since the Second World War).

11 The assumptions underlying the macroeconomic projections are described in greater detail in Chapter 2 of the Economic Council of Canada's 28th Annual Review.

12 This means that a province whose population was growing at a rate one percentage point higher than the national average would see its GDP grow at a rate one percentage point higher as well.

13 The demographic model used for the purposes of the 28th Annual Review is essentially an updated version of the model used by the Council for its 26th Review, as well as for its study on immigration entitled *New Faces in the Crowd: Economic and Social Impacts of Immigration*, released in 1991. For a detailed description of the model, see Haider M. Saiyed, "Demographic Projection Model for Canada and the Provinces" [Economic Council of Canada, April 1988]. The updated model takes account of the most recent demographic trends and uses Statistic Canada's population estimates for 1990 as the base population.

14 This hypothesis is described in greater detail in *Population Projections for Canada, Provinces and Territories 1989-2011* (Statistics Canada, Cat. 91-520). Briefly, it assumes an economic recovery in western Canada, leading to a

partial resurgence in migration to Alberta and British Columbia similar to that seen from 1974 to 1981.

15 The transfer of responsibility for the unemployment insurance program to the provinces is assumed to involve not only expenditures on UI benefits, but also the corresponding revenues from premiums. In the case of sovereignty-association, it is assumed that Quebec also receives a portion of revenues from seigniorage.

16 The sovereignty-association option is an exception to this rule, since it involves the transfer of part of the federal debt to Quebec. In this case, the debt/GDP target is changed from 33.62 to 81.73 per cent to take this extra debt into account. As was the case for provincial debt under the other options, however, it is assumed that the debt/GDP ratio is maintained at its 1983-84 level (taking into account the allocation of Quebec's share of the federal debt) throughout the simulation period. In other words, it is assumed that Quebec does not attempt to lighten its debt load. As long as this is true, the tax effort would necessarily increase relative to the status quo (see following section on sensitivity analyses).

17 Tables listing the assumptions in detail and the complete results for all provinces are contained in a technical document, which is available upon request.

18 In the case of federal expenditures, the three scenarios shown in Figure 2 make different assumptions about the debt/GDP profile. The differences stem from the fact that interest payments on the federal debt vary from one debt/GDP profile to another.

19 There was a very substantial increase in provincial/local tax effort during the 1960s and 1970s. In particular, revenues raised at the provincial/local level increased from 16.4 per cent of GDP in 1960-65 to 29.0 per cent in 1985-90.

20 The purpose of the sensitivity analyses is to measure the impact of changing certain base-case assumptions with the "medium-debt" profile for the federal debt (see Figure 1).

21 Since we still stipulate a return to the historical spread of 165 basis points between short- and long-term rates between now and 1999-2000, this amounts to postulating a small decline relative to 1991-92 in the weighted average of current rates, since at that time the spread stood at more than 200 basis points (see Table 1). Accordingly, the convergence rates for this sensitivity analysis are about 25 basis points lower than the weighted average of current rates for 1991-92.

22 In the base case, for instance, the relatively optimistic macroeconomic assumptions regarding the vigour of the economic recovery yield a debt/GDP ratio of 49 per cent when the "medium-debt" profile is applied in 1994-95. This figure differs significantly from that forecast by the Department of Finance in its 1991 budget, which predicted a less rapid recovery leading to a debt/GDP ratio of 55 per cent in 1994-95. The prolonged-recession scenario, which assumes a higher debt level at the time the "medium-debt" profile is imposed, produces results comparable to those of the Department of Finance.

23 While our simulations do not postulate an increase in expenditures (e.g., for unemployment insurance and social welfare), which might well be expected in a prolonged recession, that does not affect the results reported here, since the key element in this analysis is the increase in deficits; it matters little whether these deficits are the result of a decline in revenues or an increase in expenditures.

24 For an analysis of the long-term effects of the constitutional scenarios discussed above, see Andrew Burns, *Regional Welfare Impacts of Some Alternative Fiscal Arrangements* [Economic Council of Canada, Working Paper, 1992].

25 In the case of the two decentralization options, the amount of "net" expenditures transferred to the provinces is equal to the transferred federal expenditures minus the increase in equalization payments associated with the increase in the respective provincial/local tax effort.

26 It is this point that leads us to consider the "implicit interprovincial transfers" associated with every expenditure program funded out of the federal government's general revenues. The delivery and financing of programs by the federal government actually involves a degree of implicit equalization, in that the result is a transfer of revenues from the richest to the poorer provinces.

27 The especially significant impact under the extensive-decentralization option reflects not only the extent of budgetary responsibilities transferred but also the nature of these responsibilities. The expenditure categories ceded under the latter option include several programs (e.g., unemployment insurance) for which there are significant differences among the provinces as to their residents' need for the particular program. Since the current equalization formula takes no account of interprovincial disparities in need but only inequalities in fiscal capacity, the official equalization system will prove even less able than it was under the moderate-decentralization option to compensate for the loss of the "implicit interprovincial transfers" that are now associated with the funding and delivery of these programs by the federal government.

28 These premiums on *effective* borrowing rates reflect an assumed premium of roughly 100 additional basis points over *current rates*, applicable to all new

debt taken on by governments (including any debt up for renewal) in the period immediately following the effective date of new constitutional arrangements. That is why the premium imposed on the Canadian provinces (only half of whose debt is assumed to come due in the period affected by the premium) is lower than the premium imposed on the federal government (about two thirds of whose debt is short-term) and that imposed on Quebec (which, presumably, must renegotiate all of its "new" debt in addition to its short-term debt during the period concerned.)

29 For total expenditures and revenues, the correspondence between aggregated simulation data and historical data is ensured by a residual revenue and expenditure category.

30 See Appendix A.

31 *New Faces in the Crowd: Economic and Social Impacts of Immigration* [Economic Council of Canada, 1991]. For items under health care, primary and secondary education, postsecondary education, and social assistance, we used data breakdowns from a technical document by Denis Chénard and John Serjak entitled "Aging of the Population, Social Costs, and Immigration," [Economic Council of Canada, Working Paper, forthcoming].

32 Data on premiums and benefits were drawn from Revenue's Canada "Green Book" (*Taxation Statistics*) for 1985, which supplies figures broken down by age and sex. The data on premiums cover only the employee's contribution; thus the amounts are multiplied by 2.4 to reflect the employer's share.

33 Frank T. Denton, Christine H. Feaver, and Byron G. Spencer, *MEDS – Models of the Economic-Demographic System: A Report on the Project and Some Preliminary Analysis* [McMaster University, Canada, QSEP Research Report No. 246].

34 The purpose of this section is to present a general overview of the structure of the model's equations. A detailed specification of the model's equations may be found in the complete technical document, which is available upon request.

35 To cite an extreme example, an allocation rule for national defence expenditures based on the balance-sheet method would require us to presume that, should total expenditures on defence remain the same after the ceding of military responsibility to the provinces, Nova Scotia would assume a much higher share of these expenditures than the other provinces, simply because the federal government currently spends a considerable amount on the naval sites located in that province. For all practical purposes, it is extremely

unlikely that an "independent" Nova Scotia would have any intention of spending this kind of money to defend its territory.

A less extreme example is the federal government's general spending in the National Capital Region on activities that benefit Canadians in all regions. Under the balance-sheet method, the lion's share of these expenditures would be allocated to Ontario, when the actual distribution of these expenditures following constitutional reform would likely conform much more to the current distribution of benefits to the residents of the various provinces.

36 The choice of a different allocation rule should not be taken as any disparagement of the balance-sheet method as such. Clearly, it might be useful to know exactly where federal expenditures are going when trying to gauge the macroeconomic impact on the provincial economies of the public sector's expenditures and tax measures. Many authors, however, have tried to use this technique to assess the "gains" and "losses" associated with regional or provincial membership in the Canadian federation. That is a much more debatable proposition.

37 However, the federal expenditures "allocated" to a province may still evolve over time in response to demographic factors.

38 The exceptions are national defence, veterans' benefits, and Official Development Assistance, which are all assumed to evolve in line with provincial GDP, primarily because international comparisons of expenditures in this sector are usually based on GDP. Native affairs are another exception; these figures are allocated according to an ad-hoc rule based on a probable distribution of land claims awaiting resolution, (i.e., according to the provincial shares of the Native population reported in the last census).

Federal debt service is a special case; like expenditures on defence and foreign aid, responsibility in this area is generally not reassigned under the various constitutional options studied, so that the allocation rule would normally have no effect. The only exception is the "sovereignty-association" option, under which the rule must make the assumption that the current federal debt load is to be divided up in some way. The ESM exogenously determines a sharing ratio between Quebec and the rest of Canada for the purpose.

39 Allocating agricultural expenditures to Quebec pro-rated on the basis of population, therefore, would undoubtedly attribute more expenditures to that province than if the criterion was the current distribution of federal expenditures (which, particularly in recent years, have favoured western grain farmers). However, such a rule would still give us a good idea of the kind of expenditures that Quebec might have to assume as a sovereign entity (or even should the federal government decide to abandon farm policy completely) in

order to help – through income support programs and other measures – its dairy producers (and other producers of foodstuffs governed by national supply management programs), who stand to lose privileged access to the rest of the Canadian market.

40 In particular, the rule seems reasonable enough for several major expenditure items, such as national defence (including veterans' benefits), foreign aid, and debt service. It is also probably appropriate for some other categories that are of benefit all Canadians, including transportation and communications, the environment, justice and law enforcement, and direct federal expenditures (i.e., excluding transfers) on health care, education and social services. For the other categories (i.e., manpower training, regional development and sectoral policies, housing, and "other" federal expenditures), the rule may not be so suitable. Note, however, that the latter categories accounted for only about 16 per cent of total federal expenditures in 1990-91.

41 Since these assumptions are not integrated into the actual equations of the model, they could be changed fairly readily. We decided against this course, however, because of the lack of reliable information on the true extent of the economies of scale and unproductive overlaps between the federal government and the provinces.

42 Given the lack of relevant data, we were unable to make any adjustments to reflect the proportion of these liabilities held by individuals in forms not subject to Canadian income tax (i.e., non-residents, pension plans, RRSPs, and other tax shelters). As a result, the level of revenues from taxation of interest on public debt is overestimated. For the historical period, this has no impact on total budget revenues, since the other-general-revenues component is derived residually and thus is underestimated by an equal amount. As far as the period of projection is concerned, the forecasts of total budget revenues are slightly downwardly biased, because a larger portion of revenues is negatively affected by the anticipated declines in interest rates and the size of the federal debt. In other words, the model will provide generally conservative estimates of the growth of total federal and provincial/local revenues.

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